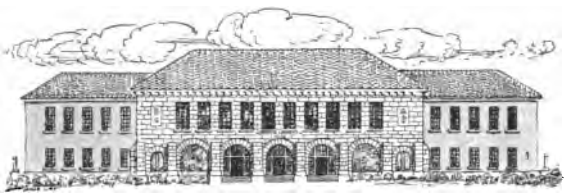

PROCEEDINGS

OF THE

NINTH ANNIVERSARY

OF THE

UNIVERSITY CONVOCATION

OF THE

STATE OF NEW YORK,

Held August 6th, 7th and 8th, 1872.

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CONTENTS.

THE UNIVERSITY CONVOCATION

OF THE

STATE OF NEW YORK.

I. Sketch of its Origin, Objects and Plan.

[Reprinted from the Proceedings of former years, by direction of the Convocation.]

At a meeting of the Regents of the University, held on the 9th day of January, 1863, the reports of colleges and academies, and their mutual relations, being under consideration, the following resolution was unanimously adopted:

Resolved, That it is expedient to hold annually, under the direction of this Board, a meeting of officers of colleges and academies, and that a committee be appointed to draft a programme of business for the proposed meeting, to fix the time and place, and to make such other arrangements as they may deem necessary.

The committee of arrangements on the part of the Regents were Chancellor Pruyn, Governor Seymour, Mr. Benedict, Mr. Hawley, Mr. Clinton, Mr. Perkins and Secretary Woolworth.

The meeting was held according to appointment, on the 4th and 5th days of August, 1863. Chancellor Pruyn briefly stated the objects entertained by the Regents, which were mainly "to consider the mutual relations of colleges and academies, and to promote, as largely as possible, the cause of liberal education in our State. While it is a part of the duty of the Regents of the University to visit the fourteen* colleges and more than two hundred academies subject to their supervision, it is obvious that this cannot be done as frequently as desirable, and that some such method as is now proposed, whereby teachers may compare views with each other and with the Regents, and discuss methods of instruction and general modes of procedure, is alike practicable and necessary.

"A law enacted more than three-fourths of a century ago was cited, by which the University was organized and clothed with powers similar to those held by the Universities of Cambridge and Oxford in

*Now twenty-two (1873).

England. The University of the State of New York, though generally regarded as a legal fiction, is, in truth, a grand reality. The numerous institutions of which it is composed are not, indeed, as in England, crowded into a single city, but are scattered, for popular convenience, over the entire State. It is hoped that the present meeting will more fully develop this fact, in accordance with which the officers of colleges and academies now convened are cordially welcomed as members of a great State University. It is also confidently expected that the deliberations now inaugurated will result in the more intimate alliance and coöperation of the various institutions holding chartered rights under the Regents of the University."

The Chancellor and Secretary of the Regents were, on motion, duly elected presiding and recording officers of the meeting. A committee, subsequently made permanent for the year and designated as the executive committee, was appointed by the Chancellor to prepare and report an order of proceedings. Among other recommendations of the committee, the following were submitted and unanimously adopted:

The Regents of the University of this State have called the present meeting of the officers of the colleges and academies subject to their visitation, for the purpose of mutual consultation respecting the cause of education, especially in the higher departments. It becomes a question of interest whether this convention shall assume a permanent form and meet at stated intervals, either annually, biennially or triennially. In the opinion of the committee it seems eminently desirable that the Regents and the instructors in the colleges and academies should thus meet, with reference to the attainment of the following objects:

1st. To secure a better acquaintance among those engaged in these departments of instruction, with each other and with the Regents.

2d. To secure an interchange of opinions on the best methods of instruction in both colleges and academies; and, as a consequence,

3d. To advance the standard of education throughout the State.

4th. To adopt such common rules as may seem best fitted to promote the harmonious workings of the State system of education.

5th. To consult and coöperate with the Regents in devising and executing such plans of education as the advanced state of the population may demand.

6th. To exert a direct influence upon the people and the Legislature of the State, personally and through the press, so as to secure such an appreciation of a thorough system of education, together with

such pecuniary aid and legislative enactments, as will place the institutions here represented in a position worthy of the population and resources of the State.

And for the attainment of these objects the committee recommend the adoption of the following resolutions:

Resolved, That this meeting of officers of colleges and academies be hereafter known and designated as "The University Convocation of the State of New York."

Resolved, That the members of this Convocation shall embrace,

1. The members of the Board of Regents.
2. All instructors in colleges, normal schools, academies and higher departments of public schools that are subject to the visitation of the Regents, and (by amendment of 1868) the trustees of all such institutions.
3. The president, first vice-president and the recording and corresponding secretaries of the New York State Teachers' Association.

Resolved, That the Chancellor and Secretary of the Board of Regents shall act severally as the presiding officer and permanent secretary of the Convocation.

Resolved, That the meeting of this Convocation shall be held annually in the city of Albany, on the first Tuesday of August, at ten o'clock A. M., unless otherwise appointed by the Board of Regents.

Resolved, That at each annual Convocation the Chancellor shall announce the appointment, by the Regents, of an executive committee of seven members, who shall meet during the recess of the Convocation at such time and place as the Regents may direct, with authority to transact business connected with its general object.

At the fifth anniversary, held August 4th, 5th and 6th, 1868, the following resolutions were unanimously adopted:

Resolved, That there be appointed by the Chancellor at each annual meeting, a committee of necrology, to consist of three persons.

Resolved, That it shall be the duty of each member of the Convocation to notify the chairman of the committee of necrology of the decease of members occurring in their immediate neighborhood or circle of acquaintance, as an assistance to the preparation of their report.

Resolved, That the secretary publish, with the report of each year's proceedings, the original resolutions of 1863, as they are, or may be from time to time amended, together with the two foregoing, as a means of better informing the members of the Convocation in regard to its nature, and the purposes of its organization.

II. MINUTES OF THE NINTH ANNIVERSARY, AUGUST 6, 7 AND 8, 1872.

The sessions of the ninth anniversary of the University Convocation of the State of New York were held, pursuant to adjournment, at the Assembly Chamber in the Capitol, in the city of Albany, commencing on Tuesday, August 6th, 1872, at 10:30 A. M., and closing on Thursday, August 8th, at 2 o'clock P. M.

The Chancellor of the University (Mr. Pruyn), as President *ex officio*, called the Convocation to order, and Rev. Dr. Van Rensselaer, President of Hobart College, said the Lord's Prayer.

The Chancellor formally welcomed the members in attendance, and stated that this duty was to have been performed by Regent Benedict, who in the Chancellor's absence in Europe, during most of the year, has acted as Chancellor *pro tempore;* but Mr. Benedict's engagements as a member of the Court of Impeachment, now in session at Saratoga, have unfortunately detained him from being present. This is the more to be regretted because from his long and active connection with the Board of Regents, his words could not fail to be both appropriate and acceptable.

The Chancellor expressed the hope that this meeting would fully realize the good anticipated to the cause of education in this State.

The Executive Committee appointed at the last Convocation, and having in charge, in connection with the officers of the Board of Regents, the arrangements for this anniversary, consisted of the following persons:

Professor William D. Wilson, D. D., LL. D., L. H. D., Cornell University.

Warden Robert B. Fairbairn, D. D., St. Stephen's College.

President Joseph Shea, S. J., St. John's College.

Principal William J. Milne, A. B., Geneseo Normal School.

Principal Samuel D. Barr, A. M., Penn Yan Academy.

Ex-Principal Jonathan Tenney, A. M., Owego Free Academy.

Principal T. Newton Willson, A. M., Troy Academy.

The Chairman of the Executive Committee, Dr. Wilson, reported the following order of exercises for the first day, which was approved by the Convocation:

Order of Exercises.

Sessions 10½ A. M. to 1½ P. M.; 3½ to 5½ P. M.; 8 P. M.

Tuesday, August 6.

10:30 A. M.—Opening of the Convocation, and Preliminary Report of the Executive Committee.

11 A. M.—The Academy as the Educator of Common School Teachers—Principal Miner H. Paddock, A. M., Medina Free Academy.

11:45 A. M.—Ethical Aspects of Science—Professor Cornelius M. O'Leary, A. M., M. D., Ph. D., Manhattan College.

12:30 P. M.—The New Departure in Education—Principal Erastus F. Bullard, A. M., Keeseville Academy.

1:15 P. M.—Miscellaneous Business.

1:30 P. M.—Recess.

3:30 P. M.—The Good of Life in College—Professor Edward North, L. H. D., Hamilton College.

4:15 P. M.—The Modifications of the established Curriculum requisite and legitimate in Colleges for young Women—President George W. Samson, D. D., Rutgers Female College.

5:00 P. M.—Miscellaneous Business.

5:30 P. M.—Recess.

8:00 P. M.—Report on the Increase of the Literature Fund—President Jonathan Allen, A. M., Alfred University, Acad. Dept., Ch'n of Committee.

8:30 P. M.—Agricultural Education—Professor John Stanton Gould, Cornell University.

Principal Miner H. Paddock, A. M., of Medina Free Academy, read a paper entitled "The Academy as the Educator of Common School Teachers."

The following is an abstract of Principal Paddock's paper: *

1. In discussing this subject, he proceeded to show, first, the character of the work to be done. This is a great work, yet like many great things in nature, very simple and elementary. It is important to keep this distinction clearly in view, lest when we should have secured an effective teacher of simple things, we furnish instead a costly and "complicated one."

2. The teacher we propose to furnish, like every implement of husbandry, should be as inexpensive as possible, consistent with effective results of the simple character described. The limit of attainments ordinarily required for a district school teacher lies so close to the ordinary knowledge possessed by the people, that it does not surprise us to see any young man or woman of fair abilities become a successful district school teacher.

After showing that legal, medical, and even theological pursuits are

* Many of the persons who read papers before the Convocation, or who participated in the discussions, furnished abstracts of their statements, at the request of the Secretary, for publication in the daily newspapers. Such abstracts are preserved in these minutes, to which most of the papers in full are appended.

carried forward to a certain extent by non-professional workers, he proceeded to show the special adaptation of academies and union schools to prepare, by a limited course of instruction in their several localities, the teachers required for the great majority of our district schools, instead of a large number of special normal and training schools. This position was sustained by six objections to such special training system:

1. The simplicity of the work.
2. The necessary discount to be made, from all graduating classes, of unsuccessful and unemployed teachers.
3. The great expense of establishing and maintaining normal schools.
4. The high wages demanded by professionally trained teachers.
5. The diversion from the academies, in large numbers, of pupils who ought to prepare for college, or for other pursuits than teaching.
6. The rivalry and animosity engendered by a system which distributes State aid so unequally in different localities.

The facilities offered by academies and union schools were enumerated:

1. They have the scholars at hand, or within their immediate vicinity.
2. The original outlay for building, etc., is comparatively very small.
3. A very moderate amount of State aid will render each of these schools thoroughly effective in all their departments.
4. Under this stimulus, these schools would furnish large numbers of candidates for the colleges.
5. There would be no necessary discount for those disqualified to teach, as this would not be the sole object of the instruction given.
6. The advantages of home for the scholar, and of local recognition for the successful teacher, would be much more largely enjoyed.
7. The academies are entirely competent to do this work.
8. All valuable and improved methods of teaching and training can be employed and would become more widely diffused under this system.
9. The work must and will be mainly done in this way.

The speaker closed by showing the interests of academies and union schools alike, in the matter of obtaining, as educators of teachers, due recognition from the State in her legislative appropriations.

Professor Cornelius M. O'Leary, A. M., M. D., Ph. D., of Manhattan College, read a paper on the "Ethical Aspects of Science."

This paper was discussed, generally in terms of high approval, by President Samson, of Rutgers' Female College; Dr. Steele, of Elmira; Principal Gallup, of Houghton Seminary; Professor Wilson of Cornell University, and Chancellor Pruyn.

Principal Erastus F. Bullard, A. M., of Keeseville Academy, read a paper entitled "The New Departure in Education," of which the following is a brief synopsis (Regent Warner in the chair):

With all the wisdom of the past we do not yet venture to say that we are the wisest men that have lived. Do we, indeed, wholly avoid the failures of our fathers? How much do we improve upon their successes? They were men of progress and friendly to reform. And were they to appear among us to day should we have to plead excuse for what we have done? Would they recognize in us their rightful successors?

No one will contend that no departure has been taken from the course so long pursued by the revered teachers of the past. But we may well ask why was any departure at all necessary from a system which confessedly produced the ripest scholars, the ablest statesmen the world has yet seen. Shall we answer that discovery and invention have conditions of life, that the system of our fathers had its day, or that the spirit of the age demanded it? No. The new is the natural development of the old. It is the tree with its broad spreading branches of which the old was the promise.

Again, it may be asked in what spirit was the departure taken; and what spirit is now shaping its course? Was it to render the mind an instrument for gain to subject the noble powers to the ignoble service of mere physical want? Or was it for the sake of a true culture, to give man all that will best fit him to comprehend, appreciate and gain the end of a true manhood and a true life?

It may still further be asked, what are the aims of the new departure and their actual tendencies? First, it aims to be comprehensive, to garner within its course all the treasures of the world's wisdom. But does not a system comprehending so much, tend more to dissipation in aim and effort than to order and system, to shallowness than to soundness and depth in scholarship? How do the results thus far compare with the old system? Second, it aims to be practical. This, indeed, should be and is the end of every true system of education. But the tendency of this practical aim, first, is to pervert the meaning of the term itself; second, to lead into error as to what education really is; third, to lead into error as to the best process of educating; and fourth, to lead into error as to the true end and office of education. In the third place, the new departure aims at economy. It is the aim and purpose of the new schools to make education as cheap and quick as possible. But to educate requires time. It requires directness of aim and purpose. As educators, we need first of all to teach that life is more than a trade, that the things most truly practical in it are those which contribute most to happiness, virtue and truth. We need make it a high aim to teach what a true culture really is, something of what it costs, its best means, and its true end. When this is fully accomplished, will there then be need of another departure in education?

Recess until three o'clock P. M.

AFTERNOON SESSION—THREE AND ONE-HALF O'CLOCK.

Professor Edward North, L. H. D., of Hamilton College, read a paper on "The Good of Life in College."

He began by saying that a college instructor might not be regarded as an impartial judge of the advantages of collegiate discipline. He might be likened to a judge on the bench, with a bribe in his pocket. In order to avoid this objection, twenty letters had been sent out to as many graduates, in which they were asked "what was the best thing they had gained from their life in college?" The question was addressed to graduates of different institutions, who have reached the maturity of their powers, and who represent all departments of intellectual labor. The replies to this question point to such a variety of advantages from undergraduate discipline that they suggest a feeling of hopefulness even in the case of graduates, of good character and industrious habits, who fail to distinguish themselves in mathematics, or classics, or metaphysics.

Three graduates wrote that the best thing they learned in college was a knowledge of themselves and what they were good for. Three were especially grateful because their college studies introduced them into the republic of letters; four, because the college gave them mental discipline; three, because the study of ancient classics conferred the power of expression and a mastering of the English language. One graduate gained in college the habit of close observation; three wrote that they were nurtured and strengthened in religious character; three were confident that the friendships and social culture of college years were well worth all the expense incurred.

The subject of Professor North's paper was discussed, and his treatment of the same was highly commended by Dr. Clarke, Secretary Woolworth, and Principal Gregory, of Geneseo Academy.

President George W. Samson, D. D., of Rutger's Female College, read a paper on "The Modifications of the Established Curriculum requisite and legitimate in colleges for young women."

The paper referred to the arrangements for collegiate lectures to young women made the past year near the Universities of London and Cambridge, England; to female colleges now organizing in Russia and Germany, and as proposed in France, and to the numerous calls for similar provisions in America, namely, the admission of young women to our established colleges, and the forward steps taken in the State of New York to provide special institutions for women, which afford college training and grant college degrees. It was stated that in every age and nation the standard of general culture is dependent on female education, as even the Japanese are learning. It was urged that woman's special cast of mind and her sphere give her a moulding influence over mature men and children which demands an education as complete as that given to young men, while the successful performance of the duties of life required of most women indicates the importance and efficiency of full collegiate education. That cast

of mind and that sphere of influence suggest that some modifications in the established college curriculum are requisite. The amount of ancient languages should be less and their attainments in modern languages higher than in colleges for young men. Their mathematical studies should be abbreviated in their application to the mechanic arts and extended in their relation to the fine arts. Other minor modifications were hinted. As the State of New York has recently given charters authorizing female colleges to give the degrees conferred in other colleges, "except professional," they should not do discredit in these modifications to their trust.

The subject of President Samson's paper gave rise to an animated discussion, in which Regent Warner, Principals Gallup, Clarke and Gregory, and Professors Wilson and Gould, participated. One point made in the discussion was that what is needed is not so much a change of curriculum as some means of increasing the physical stamina of women. The opinion was expressed that there may be danger of too much brain labor in our schools for women, especially in view of the conceded degeneracy, in almost all cases, in the offspring of persons of great intellectual culture.

The Convocation then took a recess until eight o'clock P. M.

Evening Session—Eight o'Clock.

President Jonathan Allen, of Alfred University, chairman of the committee of ten appointed by the last Convocation "to secure by legislative action the increase of the Literature Fund," made an extended report on this subject, and submitted the following resolution, which was laid over for further consideration:

Resolved, That this Convocation appoint a committee of fifteen to secure, with the coöperation of the Regents, the perpetuity of the legislation already obtained, and to perfect and secure the passage of a supplementary law, in such form as shall unite the academical institutions and the common schools of the State in more intimate and mutually helpful relations, to the end of promoting thereby a more thorough training in the common English, as well as the higher branches of education.

Professor John Stanton Gould, of Cornell University, read a paper on "Agricultural Education," setting forth the popular lack in this direction, and the need of departments in our colleges and universities, for imparting this kind of knowledge.

Regent Warner insisted upon the necessity of a certain amount of

practical hard work and experience before a boy can be advantageously trained in agricultural colleges.

Principal Paddock said that Professor Gould's paper alone had more than repaid him for his journey from Orleans county to Albany. He regarded the subject as one of the greatest practical importance, and thought an elementary text-book on agriculture should be introduced into our schools.

Regent Lewis said he would like to state "What I know about farming," which is, that theory and practice must go together, whether in the profession of law or of agriculture. On this point, Professor Gould and Regent Warner agree entirely with each other, and he himself agrees with both.

Dr. McNaughton, as perhaps the oldest member of the Convocation, said that he knew something about farming, having been intimate in early days with that eminent agriculturist, Jesse Buel, and others of like eminence, and that so-called gentlemen farmers like these are highly useful, just as an architect is useful, though not himself a practical builder.

Dr. King thought it desirable that professors of agriculture should itinerate through the State, and bring such matters as Professor Gould has presented, to the notice of the public generally.

President White, of Cornell University, spoke briefly of what has been accomplished in this direction at that institution. He stated that Mr. Cornell has a great aversion to the term "model farm," and that they actually have two farms for different purposes—one the plain "Scotch farm," the other more ornamental. The great difficulty is in the multitude of counselors, as no two agree in their advice. With reference to the small number who enter this department, he expressed himself as not at all discouraged, and cited at length some facts on this point derived from his observation abroad. He thought Principal Paddock's suggestion as to feasibility of introducing an elementary text-book on agriculture into our schools a good one, and likely to be far more useful than most of the present text-books in geography.

Professor Gould made some statements by way of correcting misapprehensions entertained by some of the Convocation.

The subject was further discussed by Principal Curtiss and Prof. Mears, who deprecated any disposition on the part of the Convocation to glorify the so-called "bread and butter sciences."

The Convocation then adjourned to meet to-morrow morning at nine o'clock.

SECOND DAY.

Wednesday, Nine o'Clock, A. M.

Rev. Patrick F. Dealy, S. J., of the College of St. Francis Xavier, said the Lord's Prayer.

Chancellor Pruyn invited the members of the Convocation to meet at his residence, at the close of the evening session.

Invitations from Professor Hough, Director of the Dudley Observatory, and from the Young Men's Christian Association of this city, to visit the rooms of these institutions respectively, were received and accepted, with thanks.

Dr. Wilson, Chairman of the Executive Committee, reported the following order of exercises for the day, which was approved by the Convocation:

Order of Exercises.

Wednesday, August 7.

9:00 A. M.—Opening of the Convocation, and Report of the Executive Committee (continued).

9:15 A. M.—Herbert Spencer's Religion—Professor John W. Mears, D. D., Hamilton College.

10:00 A. M.—Should Study in College be confined to a uniform Curriculum, or should it be made to any extent elective?—President Frederick A. P. Barnard, D. D., LL. D., Columbia College.

11:15 P. M.—The Moral and the Secular in Education—Professor Tayler Lewis, LL. D., L. H. D., Union College.

12:30 P. M.—What shall we do with the Books?—Principal Charles H. Crawford, Almond Academy.

1:15 P. M.—Miscellaneous Business.

1:30 P. M.—Recess.

3:00 P. M.—A method of Integrating the Square Roots of Quadratics—Professor Henry T. Eddy, C. E., Ph. D., Cornell University.

3:15 P. M.—The Co-Relation of Academies and Universities—Principal Wesley C. Ginn, A. M., Ithaca Academy.

3:45 P. M.—Report on the Metric System of Weights and Measures (including President Barnard's Paper, read and referred at the last Convocation).

Professor Charles Davies, LL. D., Fishkill Landing,
Regent Robert S. Hale, Elizabethtown,
Professor James B. Thomson, LL. D., New York City,
} Committee.

5:15 P. M.—Miscellaneous Business.

5:30 P. M.—Recess.

7:30 P. M.—Report on the Military Roll of Honor.

8:00 P. M.—University Necrology:

Vice-Chancellor Erastus Corning, Albany .....
Professor Samuel F. B. Morse, LL. D., University of the City of New York .....
Professor George W. Eaton, D. D., LL. D., Madison University ..... } *Deceased.*
Professor Edward W. Root, Hamilton College .....
Trustee William Kelly, University of Rochester.....

Secretary Samuel B. Woolworth, LL. D., Albany...
Professor Edward North, L. H. D., Hamilton College..... } Committee.
Professor Daniel S. Martin, A. M., Rutgers' Female College.....

8:45 P. M.—Adjournment, to re-assemble at Chancellor Pruyn's residence, according to invitation.

The Convocation resolved to commence the third day's sessions (Thursday) at 8 A. M., and to adjourn at 2 P. M.

Professor John W. Mears, D. D., of Hamilton College, read a paper on "Herbert Spencer's Religion."

After paying a high compliment to the vigor, perspicuity and originality of Herbert Spencer as a thinker and writer, Professor Mears proceeded to examine the argument contained in his First Principles upon the nature of the religious idea. Spencer, by his attempt to reconcile religion and science, admits, as Comte does not, the importance and scientific claims of religion as an essential element in human experience. He also leaves the religious idea in a really, though but slightly, better philosophical position than does Sir Wm. Hamilton, who relegates the idea entirely to the field of faith outside of the domain of philosophy.

Prof. Mears then showed that this philosophical idea of Spencer is vague, unpractical, denying all possible relations between the Supreme Being and the soul of man, and scarcely distinguishable from blank Atheism. He combated the position that religion owes its present degree of purity and elevation to the growth of science, compelling it to drop one after another of its dogmas. On the contrary, the dawn of history shows us a pure monotheism already established, not only among the Hebrews, with their sublime literature and their lofty moral code, but also in China, India and Persia, the progress of religious thought being plainly retrograde in these latter countries. What, he asked, had the compulsion of science to do with the formation of these pure ideas in primitive times. A philosophy which deals thus recklessly with the established facts of history is nothing better than a splendid reverie.

But Mr. Spencer, when speaking of religion, means his own notion of religion, and, consciously or unconsciously, sets himself forth as the only true teacher of religion the world ever had. All religions, down to his time, have been largely irreligious. Science has indeed dealt hardly with his religion. It has stripped it of everything except the concession of the want of religion. Religion is simply the blank

admission that there is something utterly inscrutable behind all the phenomena of nature. We instantly become irreligious when we claim to know anything of this something. The ideas of Creation and of First Cause are equally irreligious with the negations of Atheism. Dr. Mears showed the absurdity of calling a power utterly inscrutable, which, by Spencer's own statement, was manifesting itself in all nature, and declared it difficult to see how Spencerism is preferable to Positivism. Positivism ignores the whole problem, but Spencer gives us a philosophy of the unknown and unknowable, which requires as a religious act the total renunciation of all power, possibility or purpose of man to comprehend it, which places in our way an awful, inscrutable sphere, propounding to us life and the universe as mysteries, and threatening to crush us if we attempt to solve them.

President Frederick A. P. Barnard, LL. D., of Columbia College, read a paper on "Elective Studies in Colleges."

The speaker began by saying that this subject had been under discussion for more than half a century without being settled, yet that the condition of the question had been materially changed in the meantime, without affecting as they should the manner of its treatment. The course of study early in the century was much less varied than at present, and was much more largely classical. The change has been no less great in England than in this country, so that at Oxford the degree of Bachelor of Arts may now be obtained without any Latin or Greek after the first year.

The theory of collegiate education has always been that mental discipline, and not the acquisition of knowledge, is its main, if not exclusive, object. On this theory the modern innovations have injured the system. Ought not the principle of election to be admitted, if only to enable the student to correct this in his own case?

The old theory insists that the instruction should be uniform, on the ground that uniformity of mental development should be the invariable aim. The speaker believed the ages of students in the colleges at present to be too much advanced to make this theory any longer admissible. No power of educational culture will produce the same results with different minds. Diversity of attainment is as necessary in the later stages of education as uniformity in the earlier. The average age of college graduates in New England and New York at this time is as high as twenty-one years. A student ought certainly to be competent to participate in the direction of his own education at least a year or two before he becomes a citizen and a voter.

To the objection that when option is allowed students will be tempted to choose the "easy" studies, the speaker replied by saying that the studies are "easy" when they accord with the mental bent which earlier training has developed, without regard to the labor exacted for their prosecution, and are "hard" when they are out of harmony with this. Experience at Columbia College and at Harvard University has proved the truth of this statement.

Much of the opposition made to the introduction of the elective system the speaker believed to arise from considerations purely economical. Under this system the number of exercises which the officers are required to conduct is necessarily increased, perhaps largely. Hence follows the necessity of an increase of the academic staff, and consequently an enlargement of expense. This consideration will prevent universal introduction of the system; but its effect, whenever established, upon the character of the teaching, will necessarily be elevating, and it will induce probably a large post-graduate attendance.

The institutions which adopt the system, or some of them at least, will thus become, with progress of time, more and more assimilated to universities of Continental Europe. We have many projects for the creation in this country of institutions of this high order, upon new and independent foundations. Such projects, if carried out, would involve vast outlays. In the view of the speaker it would be unjust to the existing colleges so to distract the public bounty. Our colleges, if supported by appropriations made to them in the same liberal spirit, will give us, in due time, the real American University.

The subject of President Barnard's paper was discussed by President Samson, who remarked that the paper of President Barnard suggests that the time may have come to draw the line between the College and University. The sphere and office of the Common School, the Academy, the College and the University are severally distinct. The Common School in large cities grows up to the Academy. Many of our Academies aspire too much to be Colleges, and our Colleges all have assumed the double work of the College and the University. The English University, a cluster of Colleges, is the highest type yet developed in our country. The German and French University was attempted in the University of Virginia and elsewhere in the south. But in practice these blended the Academy, the College and the University.

If under the administration of President Barnard, Columbia College, whose immense revenue gives the facility, should be made a university, separated from the college proper, whose curriculum might stop, as does the German gymnasium, with the disciplinary as distinct from improving studies, then there might arise perfect harmony of views as to what studies should be elective, and at what period of education an election of studies might begin.

Principal Gregory remarked that when we ask, should study in college be made to any extent elective? we seem to speak of a novelty which seeks introduction. Had the question been whether young men of nineteen should begin to discriminate between possible studies in favor of those which will contribute most to their future course of life, it will be a question whether they should continue to do as in the past they have done; for at that age, for generations, they have been done with college and have begun their technical and professional studies, with others correlated to them.

The laws of universal individuality and the economic progress of the ages demand it. Exact counterparts in nature are mere observa-

tions of nature, yet individuality is universally neglected if not repressed. The age is one of application and achievement; and the man who is to maintain himself, and prove a blessing to his age, must be master of that in which he is greatest. This, education must find out and develop and perfect.

Prof. D. S. Martin said that there are one or two very important considerations to which he desired to refer. The end of the college, properly so called, is not to make specialists, not to give professional training, but to introduce the opening minds of the young to the wide field of human knowledge, to place in their hands the keys of all intellectual treasures. And though it is not possible to lead students far in any one direction, in the limits of a college course, we can thus make them familiar, in some degree, with the varied forms of culture, and thus render them truly educated. Many men, who in their college course have sacrificed some departments of study for the sake of more "practical" information, are crippled through life for the want of these very forms of knowledge.

Much of the difficulty that we are wont to hear of, between religious and scientific thinkers, arises from the want of knowledge and sympathy between them, because each is unfamiliar with the general principles of the other's modes of thought. How often, too, do we see scientific works full of bad Latin, and, perhaps, worse English? When, therefore, we hear the natural lament of instructors over the scanty and imperfect attention that can be given to any one department in the college course, and listen to the precepts, "*ne multa, sed multum*," and "do one thing only, and do that well," we are really encountering what is, in some important respects, an educational fallacy.

Or should we inquire as to the propriety of allowing one who has achieved a certain degree of advancement hereafter to select a portion of his studies, it is plain that men thus advanced have hitherto thus chosen, and the question is concerning the maintenance of a right long held. The source of the idea that it is a novelty lies in this: that colleges have advanced their curricula until the man of such an age and advancement is still an under-graduate, and the question is, shall that circumstance deprive him of the benefit he previously enjoyed?

If asked concerning the minds of those still young and in a formative state, the answer must be that neither pupil nor parent should exercise the choice as to the studies; but that, having settled their wishes in regard to the boy's future, the wisdom of the teacher should be relied on to choose what studies will best secure the fulfillment of those wishes.

Professor Jewell remarked that Dr. Barnard's paper presses upon every practical teacher a new problem in teaching, especially among undeveloped minds, that is, not to secure mastery of a study, the completion of a course, nor even the production of a merely symmetrical and accomplished scholar. It is this: *To detect and develop*

the dominant capacity in every mind, without neglecting other collaterals.

Professor Tayler Lewis, LL. D., L. H. D., of Union College, read a paper on "The Moral and the Secular in Education" (Regent Ottendorfer in the chair).

Professor Martin, of the University of the City of New York, expressed so high an appreciation of the profound and admirable paper of Prof. Lewis, that he was almost unwilling either to add to or to take away from it, yet something of each ought perhaps to be done.

The view that the predominance of spiritual ideas in society would never beget ignorance or squalor, was perhaps liable to serious limitation. The secularist writers have largely sought to show that the excessive cultivation of religious ideas in the early Christian ages had largely tended to show that result. When the monks of Alexandria, enraged at the anti-religious influences which were exerted by the scientific studies of the heathen schools of the city, destroyed the instruments by which Eratosthenes had first measured a degree of the meridian, the world had a significant lesson which we should not hesitate to profit by. The exclusive cultivation of religious idea has, to some serious extent, an influence to overwhelm all study of things of less importance, and to beget a narrowness, a bigotry and a superstition which are at variance with all secular development.

Another point which seems to require correction is the suggestion that if the State should reject all religious teaching, it would be the duty of all good men to reject the State. This, Prof. Martin could not coincide with. He could not entertain the idea of such a renunciation of the State, even in that contingency. He did not propose to abandon the State, all the less because he believed that God had constituted us members of it, and we cannot justly withdraw from the social organization for any unfaithfulness of it to its design. The only other source from which such an idea had been suggested was Herbert Spencer, who advocates the idea that a man may withdraw from society and walk in absolute isolation.

With these two corrections, Prof. Martin most fully and cordially coincided in the instructive suggestions of Prof. Lewis's paper. The ideas of that paper, he said, go very deep. There is not only no right to reject them, but there is no possibility of doing so. They are the sole foundation of society. All government rests on them, and particularly our own republican government. It is founded on the very idea of right, and this, as Prof. Lewis has so lucidly and wisely shown, is essentially religious. Herbert Spencer has endeavored to frame a theory without the admission of the idea of right, by asserting simply the idea of the equality of liberties. Now as a matter of fact, merely, men have not equal liberties. When Spencer's book was written there were four millions of men in our own country who had not the shadow of any liberty. As a fact, it is false; only as a theory of what ought to be is there any truth in it. Otherwise it is a mere fallacy. The sensualist himself cannot do without some

higher idea than this. When Spencer would settle the question of the right of a child to education, against the blind interest, or caprice, of the father who would deprive him of it, he has no resource but to say that it is perhaps the will of God that the child shall be educated. The will of God! What is the will of God in the eyes of one who has laboriously been teaching the world that God is unknowable?

Principal Charles H. Crawford, of Almond Academy, read a brief paper entitled "What shall we do with the Books?" the scope of which is partially indicated by the concluding paragraph, as follows:

My answer, then, to the question, "What shall we do with the Books?" is this: Require pupils to use books in school as they will need to use them after leaving school, that they may learn how to use them. I am aware that during a term's study in this way, the student will not have learned so many facts concerning the subject in hand as he would by memorizing a text-book, but he will have gained such ability to acquire the facts he will need to know in his after life as will more than compensate for this apparent loss. This loss need not be regretted; for not the largest knowledge of the contents of books, but the greatest ability to draw from them, in every emergency, just the knowledge needed, is the best "book learning."

The subject of Principal Crawford's paper was discussed by Principal Paddock, who urged, in accordance with the spirit of the paper, that we should not forego the immense advantage of the art of printing in the matter of educational economy.

Principal Clarke thought that it would be a great advantage to the cause of education were a large part of the books extant destroyed. Much discrimination should be shown in the use of books. These books should be largely adapted to the purposes of general reading, though thoroughly exact in all their definitions and statements, like Prof. Davies' own works. These important matters should be thoroughly committed to memory.

Chancellor Pruyn alluded to the desirableness, in itself considered, of some official supervision in the matter of text-books, but for various reasons it has never been deemed proper in this State, in view of existing circumstances, to take any action in this direction.

Principal Morehouse, of Albion Academy, said, in answer to the question what shall we do with the books: Read the good books and discourage the bad books. By reading, he said, he meant that the pupil should obtain precisely the same view the author had when writing the book. To get the best view of a picture, we must occupy the position occupied by the artist when producing his work. Thus pupils should learn to use books as they need to use them in after life. Besides, formulas and rules should be thoroughly memorized.

Principal Curtiss, of Sodus Academy, was pleased to find the members of the Convocation so unanimous in the opinion that text-books should be used by students, and thought it purely egotistical to pretend that we can teach so much better than books; and that if we could so teach, we could write books that would be invaluable. But the truth is, those who pretend to know so much are generally pedants that know not how to teach the books already published.

Under the head of miscellaneous business, Dr. Wilson called up the resolution accompanying the report submitted last evening by President Allen, relative to the increase of the Literature Fund, which was unanimously adopted.

In this connection, Principal King, of the Fort Edward Collegiate Institute, desired to add a word by way of emphasizing the importance of the work of the committee just ordered. He had had the pleasure, as one of the former committee of the Convocation, of being present at a joint meeting of the committees of education of the Senate and Assembly, and he was delighted to find the gentlemen then present to be men of broad and liberal views, who entered with great interest into the conversations—rather than debates—in which the welfare of the academies was canvassed, and the relation of that welfare to the educational system of the State. He had found the committee prepared to grant more than they scarcely dared to ask. In a like spirit of enlightened liberality, the Legislature had granted the proposed increase of the Literature Fund, and the Governor had approved the action. We were coming up this summer to enjoy our educational Jerusalem, at this Convocation, filled with gratitude and hope. We were counting upon a new and grand departure of prosperity that was to tell upon the welfare of the whole State, when we were astonished to find some gentlemen, themselves engaged in the educational work, announcing themselves, in public conventions, as opposed to this timely aid to the academies, and as determined to apply to the Legislature for a repeal of the act by which it was given.

He could not find language to express his annoyance and disgust, when, at the late Teachers' Association, at Saratoga, he had heard a gentleman read a set of resolutions, expressed with careful malice, to antagonize the academies in this matter. This striking at academic education in the house of its friends, he deemed both indecent and uncourteous. How many persons shared that gentleman's notions he did not know. He had learned that the gentleman succeeded, mainly by the votes of a score or two of young ladies, in passing his ugly resolutions. We have fair warning, therefore, of a contest. Let us meet it manfully. He would especially bespeak the kind co-operation of those college presidents and professors who are present, in securing just protection from the Legislature. He begged to remind these gentlemen how vitally the prosperity of the academies stands related to the prosperity of the colleges to which they are the feeders.

The munificent patrons of colleges may build ever so grand a distributing reservoir, but if the Croton fails them, of what use

will the reservoir be? Take care that the supply of students does not fail.

See to it that the bubbling springs from the hill-sides, and "the complacent brooks that make the meadows green," are not suffered to languish for want of the flattering dews of your bounty, and then the reservoirs will give forth healing streams in abundance.

Who so well as academic teachers can discern in the child and the youth a divinely organized soul, ready to expand under liberal training, and give that young mind a bias which shall put the lad to preparing for college? Take care of the academies and the colleges will flourish. Withhold this timely bounty and you drive many of them to the wall. They will die.

Recess until three o'clock P. M.

Afternoon Session—Three o'Clock.

The Convocation was called to order by the Chairman of the Executive Committee (Dr. Wilson), who presided during the session.

Professor Henry T. Eddy, C. E., Ph. D., of Cornell University, read a paper on "A new method of Integrating the Square Roots of Quadratics," which he illustrated on the black-board.

Principal Wesley C. Ginn, A. M., of Ithaca Academy, read a paper on "The Co-Relation of Academies and Universities."

The following is an outline of Principal Ginn's paper:

One of the essentials to the success of our academic system is that all the parts shall bear a natural relation to each other; that the lower grades shall be tributary to the higher, while the higher shall in no manner encroach upon the prerogatives of the lower. The fact that this relation has not been sustained by all the parts of our system may account for the falling off in the interest in liberal education; that liberal education has not kept pace with the wealth, the population and the opportunities of education in the State.

In New England we find Yale and Harvard, though not yet reaching to the full status of the true university, yet making progress in that direction, raising from year to year their standard of admission both to their regular and scientific courses, and demanding better work and fuller preparation on the part of their candidates. As a consequence the public high schools and other preparatory academic schools in those States have answered to the demand by broadening their courses and by employing teachers of better talent and of higher attainments. Here we have a complete system, beginning with the graded school system, supplemented to some extent by the private seminaries of learning, and terminating in the university and college.

In both of the above named institutions, a special effort has been made to raise the standard of admission to the scientific course to a level with the requirements of the classical course. Though differ-

ing in kind, the quality and amount of preparation are nearly alike in all the departments.

The University of Michigan, the best known of our western colleges, has entered earnestly upon the same work, and, in her Prospectus for 1873, demands of candidates for the scientific courses for that year a preparation in French and other studies, equal in amount to the classical preparation. There, too, the public school system is organized to meet these demands, just so far as the circumstances of the population will allow. How is it in our own State? Are our universities advancing their standards of admission to that degree that will bear a favorable comparison with the institutions just mentioned?

We have one university, with a history of only four years' duration, which, in that short space of time, has attained to a national reputation, and has gathered within her halls 600 students, all of them ranking as university students, yet the vast majority of them admitted with a preparation in only the common English branches, and alegebra to quadratics.

While admiring the generosity which founded it and the wisdom which would open a class of industrial, or polytechnic schools, for the better preparation of our young men for the farm, mechanic arts and various industrial pursuits, we protest, in the name of the academies, against an institution bearing the honorable name of university—a name synonymous with the richest culture and broadest and deepest scholarship—entering into competition with the academies and union high schools, in providing instruction in those branches which have been universally conceded as preparatory and belonging exclusively to the academy.

It is unfair toward academies, in that their pupils are induced to leave them before the work of preparation is complete, and the patronage so much needed at this stage of their history is withdrawn. Liberal education is robbed of its incentive, from the fact that students are encouraged to leave their preparation undone for the premature offer of university honors. A spirit of unrest is introduced among academy students, and the headlong spirit of the age is stimulated instead of retarded.

Standard of admission being low, graduation must necessarily be low; consequently the character of the university must be degraded. Prosperity of other colleges is imperiled by this unnatural competition.

All institutions bearing the name of college should demand of their students the same degree of discipline, that all college diplomas may represent the same value in literary society.

The colleges and universities should at once advance their standard, and continue to do so from year to year, till they are universities in fact as in name; and then a fair field will be open to the academies. Then will the two classes of institutions assist each other, and combine to stimulate in the young a desire for liberal culture. Then will this State—the Empire State, in wealth, in commerce, in population and in political power—become also the Empire State in letters.

The subject of Principal Ginn's paper was discussed at some length by Professor John Stanton Gould, defending the policy of Cornell University, with reference to some of the views advanced in the paper just read.

A "Supplementary Report of the Committee on Coins, Weights and Measures," submitted by Professor Charles Davies, LL. D., was read at his request, on account of ill health, by Regent Robert S. Hale, LL. D., a member of the same committee.

A minority report on the same subject was submitted by Professor James B. Thomson, LL. D. The following preamble and resolutions were appended to this report:

Whereas, in order to the facilitation of intercourse between nations, whether the same be commercial, postal, diplomatic, literary or social, it is eminently desirable that the quantities of all exchangeable commodities, and all quantities whatever which there may be occasion to mention in communications, written or oral, should be expressed in the denominations of some common and universally accepted system of weights and measures;

And, whereas, the metrological system of which the basic unit of length, called the meter, was definitely and permanently fixed by the International Scientific Commission, assembled for that purpose in the city of Paris in the year 1799, has been adopted and established by law as the exclusive system, according to which quantities are to be legally expressed in the transaction of business by nearly every people having intimate and extensive commercial relations with the United States, except the British;

And, whereas, indications too significant to be disregarded point to the probability that the same system will at no very distant day be established by law in the British islands, as it has been already in their vast East Indian dependencies;

And, whereas, it becomes every nation claiming to be enlightened to coöperate with sister nations in the furtherance of a reform of so signal importance, and so pregnant with benefits for the whole human race; therefore,

Resolved, As the sense of this Convocation, that effectual measures ought to be taken, with the least possible delay, by the Congress of the United States, by the several State Legislatures, and by educational institutions throughout the country, to acquaint the people of the United States, and all the people, with the nature and merits of the metric system of weights and measures, with the extent to which the said system has been already adopted by law and brought into actual use, and with its claims to be universally accepted and made the metrological system of the world; and to this end,

That laws should be made by Congress providing that, in the levying of impost duties upon foreign goods entered in our custom-houses, quantities shall be stated in the denominations of the in the system.

That the tariff of postal charges levied upon matter transmitted

through the mails of the United States should be revised and reconstructed upon a plan in which the limit of the weight of matter transmissible under each postal charge shall be expressed in metric denomination.

That a law should be enacted by Congress requiring that in the returns of the decennial census of the United States, in documents issued by the Bureau of Statistics at Washington, and in all papers proceeding from the executive department of the federal government, where quantities are mentioned, such quantity shall be stated not only in the denominations of weight and measure now in legal use, but also in equivalent metric values; and finally,

That the Legislatures of the several States should pass laws requiring that in all universities, colleges, academies, normal schools and common schools established by their authority, instruction in the nature and use of metric system shall be given, and that the principles of the said system shall be taught every pupil.

Resolved, further, That a copy of the foregoing preamble and resolutions, duly attested and signed by the proper officers of this Convocation, be transmitted to the President of the United States, with a request that the same be communicated to Congress; and that copies, similarly attested and signed, be sent to the governors of the several States of the Union, with the request that they be laid before their respective Legislatures.

Recess until 7:30 P. M.

EVENING SESSION—SEVEN AND ONE-HALF O'CLOCK.

The chairman of the Committee on the Military Roll of Honor (Regent Wetmore) being detained by illness from this meeting of the Convocation, the subject was recommitted for the ensuing year, the Executive Committee being authorized to print any material which may meanwhile be furnished.

The subject of University Necrology, on account of the detention of the chairman of the standing committee on that subject, Secretary Woolworth, by illness, was recommitted to that committee, with power to perfect and publish the material in their hands.

Assistant Secretary Pratt, by direction of the Chancellor, read an extract from the minutes of the Board of Regents, to the effect that at a meeting of the Board held this day, in consideration of eminent services in the cause of education, it had been unanimously

Resolved, That the honorary degree of Doctor of Philosophy be conferred on Joseph Elisha King, D. D., Principal of Fort Edward Collegiate Institute, and that the ceremony be performed in the presence of the University Convocation.

The Chancellor appointed Drs. Martin and Clarke to escort Dr.

King to the front of the desk, and thereupon formally conferred the aforesaid degree.

The Secretary also read a similar decree that the honorary degree of Doctor in Literature be conferred upon Frederick Augustus Porter Barnard, S. T. D., LL. D., President of Columbia College.

The Chancellor appointed Regents Hale and Leavenworth to conduct President Barnard to the front of the desk, and the said honorary degree was conferred in due form.

The Chancellor stated that Regent Erastus C. Benedict, LL. D., had this day been duly elected Vice-Chancellor of the Board in place of Erastus Corning, deceased, and called upon the Vice-Chancellor elect to occupy the chair during the remainder of the evening.

The following resolution was adopted, on motion of Regent Hale:

Resolved, That the time assigned by the Executive Committee to the discussion of the report of the Committee on the Metric System of Weights and Measures being inadequate to the full consideration of that subject, the report lie upon the table until the next annual meeting of the Convocation, and that the report of the Committee and the minority report be both printed.

On motion of Dr. King:

Resolved, By the University Convocation, that we gratefully recognize the action of the Legislature and Executive of the State, by which academies and academic departments of union schools are to enjoy a greatly needed increase of the Literature Fund to be annually distributed among them by the Regents, as eminently just and wise, and that we deem the prosperity of these academic institutions vitally and inseparably related, both to the wholesome working of our public free schools, to which they must supply many of the teachers, and to the welfare of the colleges and universities of the State, of which they are the natural and almost the sole feeders.

Resolved, That the resolution be communicated by the officers of the Convocation to the Governor and to the Senate and Assembly.

On motion of Dr. Clarke:

Resolved, That the Regents of the University are hereby requested by this Convocation to publish, without unreasonable delay, the proceedings of this meeting, and also the proceedings of the last annual session of the Convocation, if those proceedings are not already in print, and that they be distributed to the members of the Convocation at as early a day as practicable.

The programme for the evening having been disposed of, the discussion of President Barnard's paper on Elective Studies in College was taken up, and President White, by special request, gave his views on this subject.

President White said, in substance, that he had greatly admired the paper of Dr. Barnard. It had occurred to him, while agreeing with much that had been so well said, that more use might be made of optional courses, to the advantage of many students. As a compromise he had thought favorably of what might be called a bifurcated course; to have fixed courses up to a certain point, and then to allow the student some choice in his subsequent studies. His experience at Michigan University taught him that we can safely leave the students of colleges a much greater liberty of choice than has been thought safe. At the ages of 17, 18 and 19, young men are generally called upon to make grave decisions in life. Now, as to college courses, why shall not young men, conferring with parents and professors, decide what course of study they had better take?

The result with fixed courses in the old colleges has not been so remarkably or uniformly successful as to justify such prejudices against trying modified courses. The scientific courses of Yale and elsewhere have been a benefit to the regular courses. Fewer young men leave them. The question of fixed or optional courses cannot be determined by theorizing. The test of practice is required. Formerly, scientific students were looked down upon, but not so of late. We shall soon know, from the experience of existing institutions, what is the comparative benefit of the two systems. The problem is getting a solution at Cornell. Some students who reject Greek and Latin pursue German with great thoroughness. On the opening of the Cornell University, when 200 or 300 young men passed around him and asked, what shall we do? he was greatly embarrassed. In a short time, however, young men settled into courses for which they were prepared. There is danger of young men whiffling from one to another. Common sense is needed in managing, and a remarkable firmness. The German university system was tried first at Michigan University. There any student can take any three studies he chooses. Each student must take three. That is our rule at Cornell. His experience is that more flexibility, more liberty is an advantage. In conclusion he would urge one point. Nothing is worse for classical studies than to fasten twenty young men who love them with twenty who do not. With a course of options you can allow these latter to change to their advantage as well as greatly to the benefit of the better classical students. In this way the Latin and Greek classes can be pushed to higher grades than they could otherwise attain.

The subject was further discussed by Dr. Lambert, of New York city, until the hour of adjournment arrived, when the members repaired to the Chancellor's residence, in accordance with his invitation.

THIRD DAY.

Thursday—Eight o'Clock, A. M.

The Convocation was called to order at eight o'clock by Vice-Chancellor Benedict, and was opened with the usual devotional services conducted by the Rev. Dr. Wilson.

The concluding report of the Executive Committee, including the order of exercises for the day, was submitted and adopted as follows:

Order of Exercises.

8:00 A. M.—Opening of the Convocation, and concluding Report of the Executive Committee.

8:30 A. M.—The Relations of the Schools of the State—Principal Oliver Morehouse, A. M., Albion Academy.

9:15 A. M.—Report on (1.) A Course of English Studies appropriate to Academies and High Schools; (2.) Compensation of Teachers; (3.) Preliminary Academic Examination.

Ex-Principal Jonathan Tenney, A. M., Owego Free Academy.....
Professor Le Roy C. Cooley, Ph. D., State Normal School, Albany..... } *Committee.*
Principal Abraham Mattice, A. M., Hudson Academy.....

College Section—Senate Chamber.

10:00 A. M.—Honorary Degrees (including Warden Fairbairn's individual Report made at the last Convocation and referred to the Committee).

President Andrew D. White, LL. D., Cornell University.....
Principal Joseph E. King, D. D., Fort Edward Collegiate Institute ..... } *Committee.*
Warden Robert R. Fairbairn, D. D., St. Stephen's College.....

Academy Section.

10:00 A. M.—School Apparatus—Principal Solomon Sias, A. M., New York Conference Seminary.

10:30 A. M.—Academies and their Work—Principal James M. Sprague, New Berlin Academy.

Joint Session.

11:15 A. M.—Annals of Public Education in the State of New York (*continued*)—Assistant Secretary Daniel J. Pratt, A. M., Albany.

11:45 A. M.—Miscellaneous Business.
2:00 P. M.—Final adjournment.

Principal Oliver Morehouse, A. M., of Albion Academy, read a paper on "The Relations of the Schools of the State" urging, among other things, the importance of academies as a class in our educational system.

Principal Morehouse's paper led to an animated discussion, opened by Professor Wilson, who stated that though he had small acquaintance with normal schools, his impression was decidedly in favor of academies as places of education. He thought that the spirit of those that had been educated in the academies much superior to those that had been trained in the normal schools. He therefore sympathzied most heartily with the university, in favor of the academies, though no enemy to the normal schools.

With regard to the Cornell University, he wished to correct an impression which may have possibly been made yesterday—that it was interfering with the academies by doing this work—taking young men before they have been completely through the academies. He said Cornell had no design of doing any such thing. He did not believe they were doing so. Nothing was further from their intention.

He remarked, also, that in Cornell, most of those who entered as optional students soon found their way through some one or other of the courses, or dropped out of the university altogether.

Principal Mattice said:

I rise to heartily indorse the sentiments of Professor Wilson with reference to results of instruction in normal schools. There is in the history of almost every young man a sophomore period when he is wiser than he will ever be again. This period sometimes is reached before entering college, but most usually is found in the sophomore class in college, and there is no place like the two subsequent years in college to take this conceit out of him. Now, the misfortune of our normal schools, never so well conducted, is that they graduate the majority of their pupils at this period of life, and it requires many years and many hard knocks to get these graduates safely over this period.

Regent Lewis remarked: There is a germ of thought contained in the excellent paper read which is worthy of being elaborated, and it is to be hoped that it may hereafter be the subject of a distinct paper by some of the distinguished scholars of this Convocation. It is that which points to free education in the higher institutions of the State, and that its liberality should be extended to the academy and college as well as the primary school. Thirty years ago if the question had been asked me if there would be a time when there would be a system of free common schools in this State, it would have been answered in the affirmative, but with the qualification that it would not be in

my generation, and yet for years it has been in the full tide of practical and successful working.

I held to the maxim that "the rulers of a State should educate the children of a State." I hold to it still, but in view of the past I would now modify it so that the principle should be: "A State should educate the youth of a State," and this as well in the higher branches of learning as those taught in the primary school.

In a country like ours, why should not the children of the poor enjoy the same advantages as the children of the rich? Why should they not be fitted by the State for its service? Why should there not be a school of preparation for the civil service of government as well as its military and naval service, not by a separate school of learning, but by opening the doors of our colleges.

In this respect, our civilization is far behind that of the Chinese, where such a system has been for a long time in practical operation. The effect of such action would be the most effectual mode of accomplishing the object so much desired, and so eagerly sought for in our days, that is, civil service reform.

If thirty years have brought about so much for primary schools, why may not another thirty years achieve a result so desirable.

There is not time now, even had I a detailed plan, to present and discuss it. The object is a feasible one, and though the doors may not at once be open to all, yet scholarships might be established, and thus furnish ample endowments for the collegiate institutions.

These thoughts are thrown out as deserving serious consideration by the thoughtful friends of education, and it is hoped that they will not only receive such attention, but pave the way to practical action, so that education, in all its departments, shall be free.

Principal Albert Wells, of Peeksville Academy, said that, however we may differ as to the details of a system of legislative aid to our academies, there is doubtless great unanimity in favor of the principle. And if the academies, for the last thirty years or more, have received but the petty dividend of the uniform appropriation of $40,000 a year, it is owing to their own inactivity in the matter.

While the Legislature has been besieged by the agents of every other interest, and millions of the people's money have been granted to corporate interests and national advancement, the friends of the academies have been too modest or too indifferent to their own welfare to engage in a concerted effort for their benefit.

We have seen what a little united and persistent effort has been able to effect. For several years I have looked with great interest on the growing attention to this subject. We can certainly put out of question the personal interest of those having charge of the academies. We have the most cogent reasons, based on the general good, to urge upon the Legislature; and I cannot doubt that the moral power and influence of the liberal educators of the State are fully adequate to every desired result.

But we must not rest satisfied with what has been done. If we remain silent, it is more than probable that the Legislature will

reverse its recent action, and cut down future appropriations to the income of the old Literature Fund, which costs the people, by taxation, nothing. Let every trustee, principal and professor in our academies make common cause in this matter, and prosecute it with persistent and untiring vigor.

Dr. King said, from a line of remarks indulged in by two of the speakers who have criticised rather freely the results of normal school instruction in the State, he apprehended that it may be inferred that this Convocation intends to antagonize the normal schools. The normal schools are not on trial before this Convocation, if they are on trial before the people. We know the instructors in these schools. They are able and worthy men, our brethren in the work of education. If they are to be arraigned, let them have notice, and they can speak for themselves.

It is premature to judge of the products of these new institutions before they are fairly under way. Give them reasonable time, and wisdom will be justified of her children. For himself, he welcomed those co-laborers heartily. With a little needed legislation to hold them to their legitimate work of qualifying their pupils to teach in the public schools, all these normal schools are greatly needed. This Convocation will give them "God speed" in their important work.

The committee appointed by the last Convocation to report on certain specified topics relative to academies, reported in part, through Principal Mattice, as follows:

PRELIMINARY ACADEMIC EXAMINATION—REPORT OF COMMITTEE.

Experience has demonstrated the wisdom of the preliminary examination instituted by the Regents.

We believe this examination has done more than any other one thing to promote *thoroughness* in our academies and high schools. While it serves as a help to the judicious teacher and a stimulus to the earnest pupil, this examination is at the same time a touchstone which tries the work of both.

Found to be of so much value in preliminary studies, we earnestly recommend the adoption, at an early day, of a similar system of examination in the higher branches of study, which are, or ought to be, pursued in all our academies and high schools.

With reference to the preliminary examination so wisely conceived and so efficiently carried out, we have but two suggestions to make viz.:

1. That the number of questions on each branch submitted be not less than fifty nor more than one hundred.

2. That in the distribution of the Literature Fund to the institutions under the care of the Regents, some account be made of those who have passed the examination in some of the branches required.

In closing this report we deem it only just to say that, in the opinion of your committee, the eminent success and the beneficial results which have hitherto attended this examination are largely due

to the earnest, enthusiastic labors of our worthy and able Secretary, and his no less worthy and able assistant.

All of which is respectfully submitted.

JONATHAN TENNEY.
LE ROY C. COOLEY.
ABRAHAM MATTICE.

The above report, as thus far made, was accepted, and the committee was continued.

The foregoing report served to introduce an extended and able discussion by Drs. Clarke, King, Steele and Jones, Principals Flack, Robb, Mattice, Morehouse, Paddock, Crawford and Cavert, Presidents Allen, White and Van Rensselaer, Professors Wilson and Gould, Regents Benedict and Warner, Secretaries Woolworth and Pratt, and School Commissioner Sturtevant. Almost all of these reiterated, and in the most emphatic manner, the estimate of the report as to the value of this system of examinations, and no word of objection, or scarcely of criticism, with regard to its present workings, was uttered. The introduction of this system, by the Regents, was characterized as marking a great era in educational progress (Presidents White, Van Rensselaer and others); as one that ought to be extended to the examination of all common-school teachers in the State (President Allen and others); and to other branches than those at present included (arithmetic, geography, grammar and spelling), especially United States history, and some of the higher branches (Dr. Clarke, Professor Gould and Principal Flack).

The matured sentiment of the Convocation was further declared by the unanimous adoption of the following resolution, introduced by Dr. Clarke:

Resolved, That the presidents and professors of the universities and colleges, and the principals and teachers of the academies of this State, here assembled, do, as public educators, recognize with gratitude the wisdom of the Regents of the University in inaugurating the system of preliminary academic examinations, which has not only raised the standard of instruction in these institutions, but which has already been productive of great good to the entire educational interests of the State.

As to the first recommendation of the report, it was remarked by Principal Flack that he had incidentally learned that it is proposed at the office of the Regents to prepare a review series of questions in geography, say one thousand in number, of suitable character for use in written examinations, and to select questions from this series, by lot or otherwise, for use at each preliminary academic examination,

allowing such series to be freely used beforehand in all the schools. He thought this a feature worthy of immediate adoption, and one which this Convocation should urge with all earnestness and unanimity.

Principal Robb thought this would be as vicious as a college "pony," or as the practice of special "cramming" for examination, and that it would utterly vitiate the results of the system.

Dr. King thought Principal Robb decidedly in error on this point.

President White declared such a series of questions, if judiciously prepared, no "pony" at all. A "pony" is a translation, a mere substitute for the thing to be learned; whereas the series of questions under consideration embodies the identical subject-matter to be learned, and the knowledge, when so acquired, would be of the most valuable character. As to cramming, there are times and seasons when nothing else is so important and necessary. Your lawyer, who is charged with an important case, must cram to the utmost; so must your civil, and especially your military engineer, when a crisis impends. Where is the harm, then, in the use of the cramming process by students who are soon to become lawyers, engineers, etc.

Principal Mattice offered the following resolution, which was adopted:

Resolved, That this Convocation recommend the preparation, by the Regents, of a manual of questions on the subject of arithmetic, grammar, geography, and history of the United States, from which selections shall be made for the preliminary academic examination.

During the discussion of the importance of history, Professor Gould recommended that great facts of human progress, rather than merely statistical items, should be made prominent in the proposed examination on this branch, and in this connection he made an allusion to the religious extravagancies entertained in the days of Michael Wigglesworth, in contrast with the tenets of our day, as a prominent illustration of the point at which he was aiming.

Rev. Dr. Jones said:

Mr. Chancellor, I will not follow the Professor who has just taken his seat in his remarks upon the changes which have taken place in religious belief, further than most decidedly to dissent from his views, and to assert that the various confessions of faith adopted by evangelical denominations, and to which the clergymen of those denominations have solemnly given their assent, and that that good old book, so eloquently referred to by Prof. Tayler Lewis, yesterday, are a standing refutation of his views. But as to the question of examination, Mr. Chancellor, it is my decided conviction, after a night's reflection, that a series of questions presented to pupils *before* their examination, and made a test of their knowledge, will fail to develop that thorough mastery of a subject which it should be our aim to cause each pupil to obtain. Is there not reason to fear that our pupils will

satisfy themselves with a bare knowledge of answers to these questions, and will confine their efforts to the preparation of such answers rather than to the understanding of the whole subject? I am constrained to deprecate this plan, fearful that it will prove a step backward rather than forward. Is it not to be feared that some teachers will use all their efforts simply in cramming the minds of their pupils with a definite number of answers rather than in training them to look upon all sides of a subject and throughly to master it? Allow me, then, to close by offering the following resolution:

Resolved, That the Regents be requested to print the questions they may prepare and send them to the principals of academies, and that a place be assigned at the next Convocation for remarks upon the use of such lists.

This resolution was, after much discussion, adopted by a small majority.

Principal Flack, as a clergyman, was of opinion that as teachers we ought not to be afraid of the progress of theological ideas in the matter referred to by his friend, Professor Gould, especially in view of the fact that the latter represents the once fiercely persecuted Society of Friends.

On the subject of extending the examination to the higher branches, Secretary Woolworth referred to the existing statute, which authorises the Regents to enforce the examination only in case of the elementary branches. It may be desirable that further legislation be secured in this matter.

In accordance with the programme, the Convocation divided into college and academy sections.

COLLEGE SECTION.

The college section met in the Senate chamber, Vice-Chancellor Benedict in the chair.

Warden Fairbairn's individual report on honorary degrees, submitted last year, and laid over for consideration, was called up.

President White, as chairman of the committee on this subject, discussed the report at some length; after which, it was

Resolved, That copies of the report of Warden Fairbairn be distributed to the college officers throughout the State, and that the further consideration of the subject be postponed to the next Convocation; also,

Resolved, That a list of the attendance of the colleges at this time be also sent, and that the colleges be requested to appoint representatives to the annual meetings of the Convocation, with an expression of opinion on the subject under consideration.

The college section then adjourned.

ACADEMY SECTION.

The chair was occupied by Regent Warner.

Principal Solomon Sias, A. M., of the New York Conference Seminary, read a paper on "School Apparatus," of which the following is an abstract:

Apparatus to illustrate the common principles is needed for our schools, not to be put in show cases for exhibition, but to be used daily in class experimenting. School charts in geography, philosophy, astronomy, are not enough; the teacher should be a live man, working every day to illustrate and fix the statements of his textbooks, and to do this in the best manner needs apparatus—not so much the costly articles as those the pupil can use for himself in the class. With all their usefulness, our manufacturers do not make the right kind of articles for illustration of the common principles. It is not their fault; teachers should devise such as they find useful, and give their patterns to the manufacturer, and the manufacturer should then produce them in good, plain and substantial style.

Principal James M. Sprague, of New Berlin Academy, read a paper on "Academies and their Work."

The paper was designed to set forth the multiplicity of duties which surround every academy, and to define the important relation of these institutions to all others. It also showed the necessity of a more earnest support of them on the part of all those interested in supplying our common schools with qualified teachers.

The subject of Principal Sias' paper was discussed by Principal Gregory, who referred, among other things, to an effective *cane* illustration employed on a certain occasion by Professor Mitchell, and to certain simple but highly useful maps, etc.

The chair (Regent Warner) stated, as a miscellaneous item bearing upon Dr. King's reference to the commissioners' convention at Rochester in June last, that he was accidentally present when it was resolved to abate the nuisance complained of (the Board of Regents); and that the said action was taken without debate, and, so far as he could discover, without assigning any cause therefor. If this is really to be done, he desired that some good and sufficient reason be stated by the complainants in the action.

School Commissioner Sturdevant, of Madison county, being present, stated that he was not in attendance at the time referred to; but had he been, and had he felt disposed to commit himself in any way, he should certainly have opposed the resolution then adopted.

JOINT SESSION.

Vice-Chancellor Benedict, as chairman of the college section, reported the action taken, as stated above.

Assistant Secretary Pratt moved that a paper on honorary degrees, by Vice-Chancellor Benedict, which he modestly refrained from presenting at the last Convocation, be printed for the use of the Convocation, which was agreed to, and with this amendment, the proceedings of the college section were adopted by the Convocation.

Assistant Secretary Pratt read a portion of a further chapter of his "Annals of Public Education in the State of New York," and the whole chapter was ordered to be included in the published proceedings of the Convocation.

Dr. Steele made a statement in regard to a proposed State educational journal, and offered the following resolution, which was unanimously adopted:

Resolved, That this Convocation approve the action of the State Teachers' Association in the establishment of the New York Educational Monthly, and hereby pledge to it their cordial support.

The following resolutions were adopted, on motion of President Van Rensselaer:

Resolved, That the thanks of this Convocation be presented to the Chancellor, Secretary and Assistant Secretary for their unremitting and valuable services in conducting its proceedings.

Resolved, That our thanks are also due to the Chancellor of the University for his courtesy and hospitality to the members of this Convocation.

The Chancellor and the Secretary severally acknowledged the courtesy extended to the officers by this resolution.

Vice-Chancellor Benedict alluded to the leave of absence for a foreign tour granted to the Secretary by the Board of Regents, especially in view of his long and valuable services and his present need of relaxation.

The following resolution was unanimously adopted, on motion of Principal Bingham, of Canisteo Academy:

Resolved, That the thanks of the Convocation are due to the several railroad and steamboat companies which have generously reduced their rates of fare for the benefit of the members in attendance, and that a copy of this resolution be communicated, by the Assistant Secretary, to the several officers through whom these favors were granted.

The following is a list of the several passenger lines to which the foregoing resolution applies:

Hudson River Day Line of Steamers.
Citizens' Steamboat Company, of Troy.
Champlain Transportation Company.

Delaware and Hudson Canal Co.: (Rensselaer and Saratoga and Albany and Susquehanna Railroad Departments.)
New York and Oswego Midland Railroad.
Utica and Black River Railroad.
Boston and Albany Railroad.
Vermont Central Railroad.

On motion of Principal Bingham, the thanks of the Convocation were also tendered to *The Argus* and *The Evening Journal*, of this city, for the use of their columns in publishing full reports of the proceedings of this Convocation.

The Chancellor announced, in regard to the committee of fifteen on the matter of the increase of the Literature Fund, that it is proposed to continue the committee of ten raised last year, with the exception of Principal Barr, who is about to leave the State, as part of such new committee; and that the other six members would be named thereafter.

The committee, as subsequently completed, consists of the following persons:

Jonathan Allen, A. M., Principal of Acad. Dept., and President of Alfred University.

Maunsell Van Rensselaer, D. D., President of Hobart College.

Joseph E. King, D. D., Ph. D., Principal of Fort Edward Collegiate Institute.

Albert Wells, A. M., Principal of Peekskill Academy.

Benjamin N. Martin, D. D., L. H. D., Professor in the University of the City of New York.

James S. Gardner, A. M., Ph. D., Principal of Whitestown Seminary.

Gilbert B. Manley, A. M., Principal of Cortland Academy.

Albert B. Watkins, A. M., Principal of Hungerford Collegiate Institute.

Noah T. Clarke, A. M., Ph. D., Principal of Canandaigua Academy.

John Jones, A. M., D. D., Principal of Geneseo Academy.

George W. Briggs, A. M., Principal of Delaware Literary Institute.

Samuel G. Love, A. M., Principal of Jamestown Union School and Coll. Institute.

J. Dorman Steele, A. M., Ph. D., Principal of Elmira Free Academy.

Alonzo Flack, A. M., Principal of Claverack Academy and H. R. Institute.

Miner H. Paddock, A. M., Principal of Medina Free Academy.

The Chancellor also appointed the following persons as the Executive Committee for the ensuing year:

Professor William D. Wilson, D. D., LL. D., L. H. D., Cornell University.

Professor Cornelius M. O'Leary, A. M., M. D., Ph. D., Manhattan College.

Professor Henry L. Harter, A. M., Potsdam Normal School.

Principal Erastus F. Bullard, A. M., Keeseville Academy.

Principal John C. Gallup, A. M., Clinton Grammar School.

Principal Abraham Mattice, A. M., Hudson Academy.

Principal Alexander J. Robb, A. M., Waterford Union School.

The standing committee on University Necrology was continued for the ensuing year, viz.:

Secretary Samuel B. Woolworth, LL. D., Albany.

Professor Edward North, L. H. D., Hamilton College.

Professor Daniel S. Martin, A M., Rutgers' Female College.

After a brief concluding address by Chancellor Pruyn, he declared the Convocation duly adjourned, to meet on the first Tuesday of August, 1873, and the benediction was pronounced by Rev. Dr. Fairbairn.

MEMBERS OF THE CONVOCATION IN ATTENDANCE.

BOARD OF REGENTS.

John V. L. Pruyn, LL. D., Chancellor; Erastus C. Benedict, LL. D., Vice-Chancellor; Abram B. Weaver, Superintendent of Public Instruction; Robert S. Hale, LL. D., Elizabethtown; Elias W. Leavenworth, LL. D., Syracuse; George R. Perkins, LL. D., Utica; Francis Kernan, LL. D., Utica; Oswald Ottendorfer, New York city; John L. Lewis, Penn Yan; Horatio G. Warner, LL. D., Rochester; Henry R. Pierson, Albany; Samuel B. Woolworth, LL. D., Secretary; Daniel J. Pratt, Assistant Secretary.

NEW YORK STATE DEPARTMENT OF PUBLIC INSTRUCTION.

Superintendent Abram B. Weaver; Deputy Superintendent Edward Danforth.

COLLEGES, ETC.

Columbia College—President Frederick A. P. Barnard, D. D., LL. D., L. H. D.; Professor Charles Davies, LL. D.

Union College—Professor Tayler Lewis, LL. D., L. H. D.; Professor Cady Staley, C. E.

Hamilton College—President Samuel G. Brown, D. D., LL. D.; Professor Edward North, L. H. D.; Professor John W. Mears, D. D.

Hobart College—Professor Maunsell Van Rensselaer, D. D.

University of the City of New York—Professor Benjamin N. Martin, D. D., L. H. D.

Alfred University—President Jonathan Allen.

St. Stephen's College—Warden Robert B. Fairbairn, D. D.; Trustee Rt. Rev. Wm. C. Doane, D. D.

College of St. Francis Xavier—Professor Patrick F. Dealy, S. J.

Manhattan College—Professor Cornelius M. O'Leary, M. D.; Ph. D.

Cornell University—President Andrew D. White, LL. D.; Professor William D. Wilson, D. D., LL. D., L. H. D.; Professor John Stanton Gould; Trustee Amasa J. Parker, LL. D.; Professor Henry T. Eddy, C. E.

College of the City of New York—Professor Gerardus B. Docharty, LL. D.; Professor Jesse A. Spencer, D. D.

Rutger's Female College—President George W. Sampson, D. D.; Professor Daniel S. Martin.

Albany Medical College—Professor James McNaughton, M. D.

New York Medical College for Women—Vice-President Tryphenia Bayard; Trustee D. E. Sackett; Dean Mrs. Clemence S. Lozier, M. D.

New York Free Medical College for Women—Professor Frederick R. Marvin, M. D.

New York State Normal School, Albany—Professor Le Roy C. Cooley, Ph. D.; Ex-Professor Rev. Frederick S. Jewell, Ph. D., Greenbush.

Fredonia Normal School—Professor O. R. Burchard (Editor N. Y. *Educational Monthly*).

Potsdam Normal and Training School—Professor Henry L. Harter.

Institution for the Deaf and Dumb (Flint, Mich.)—Professor George L. Brockett.

Dudley Observatory—Director George W. Hough.

New York State Library—Librarians Henry A. Homes and Stephen B. Griswold; Assistant Librarian George R. Howell.

New York State Museum of Natural History—Entomologist J. A. Lintner.

New York State Teachers' Association—Ex-President James B. Thomson, LL. D.; Ex-President J. Dorman Steele, Ph. D.; President Edward Danforth.

ACADEMIES, ETC.

Albany Academy—Trustee Orlando Meads.

Albany Classical Institute—Principal Charles H. Anthony.

Albany Female Academy—President Amasa J. Parker, LL. D.

Albany Free Academy—Professor Charles A. Horne.

Albany Public Schools—No. 14, Principal James L. Bothwell; No. 15, Principal Levi Cass; No. 20, Principal E. M. Torrey.

Albion Academy—Principal Oliver Morehouse.

Alfred University, Academy Department—Principal Jonathan Allen.

Almond Academy—Principal Charles H. Crawford.

Auburn Academic High School—Principal John E. Myer.

Baldwinsville Academy—Principal A. E. Lasher; Assistants Misses S. A. Lasher and Jennie L. Wright.

Bryant and Stratton's Commercial College, Albany—Assistant George H. Quay.

Canandaigua Academy—Principal Noah T. Clarke, Ph. D.

Canisteo Academy—Principal (Rev.) J. S. Bingham.

Cary Collegiate Seminary—Principal (Rev.) James R. Coe.

Cayuga Lake Academy—Principal Charles Kelsey.

Claverack Academy and H. R. Institute—Principal (Rev.) Alonzo Flack; Professor T. S. Lambert, M. D.

Clinton Grammar School, Female Department (Houghton Seminary)—Principal John C. Gallup, M. D.

Cortland Academy—Principal George B. Manley.

Delaware Literary Institute—Principal George W. Briggs.

Egbert's High School (Cohoes)—Principal Oliver P. Steves.

Fayetteville Union School—Principal C. T. R. Smith.

Fort Edward Collegiate Institute—Principal Joseph E. King, D. D., Ph. D.

Geneseo Academy—Principals (Rev.) John Jones, D. D., and H. D. Gregory.

Grammar School of Madison University—Principal James M. Taylor.

Hamilton Female Seminary—Principal M. M. Goodenough.

Hartford Academy—Secretary Grenville M. Ingalsbe.

Hudson Academy—President John Stanton Gould; Principal (Rev.) Abraham Mattice.

Hudson Vale Institute (Lansingburgh)—Principal (Rev.) A. B. Whipple.

Hungerford Collegiate Institute—Principal Albert B. Watkins; Professor R. S. Bosworth.

Ithaca Academy—Principal W. C. Ginn; Ex-Assistant Emily Bailey.

Keeseville Academy—Principal Erastus F. Bullard.

Liberty Normal Institute—Principal M. B. Hall.

Lowville Academy—Trustee Franklin B. Hough.

Monroe Academy—Ex-Principal Wm. H. Whitney.

Montgomery Academy—Principal (Rev.) Revilo J. Cone.

Munro Collegiate Institute—Principal Truman K. Wright.

Nassau Academy—Principal A. B. Wiggin.

New Berlin Academy—Principal James M. Sprague; Secretary W. F. Jenks.

New York Conference Seminary and Collegiate Institute—Principal (Rev.) Solomon Sias, M. D.

Oneida Seminary—Principal (Rev.) J. D. Houghton.

Onondaga Academy—Principal (elect) Oliver W. Sturdevant.

Owego Free Academy—Ex-Principal Jonathan Tenney; Principal T. L. Griswold.

Peekskill Academy—Principal Albert Wells.

Rochester Collegiate Institute—Ex-Principal E. V. De Graff.

Rome Free Academy—President Stephen Van Dusen; Principal George H. Barton.

Sandy Hill Union School—Assistant Frances A. Tefft.

Saratoga Springs Union School—Superintendent L. S. Packard.

Schenectady Union School—President J. J. Marlatt; Principal S. B. Howe.

Sodus Academy—Principal Elisha Curtiss.

S. S. Seward Institute, Female Department—Principal Mrs. George W. Seward; Charles H. Seward.

Troy Academy—Principal T. Newton Willson.

Waterford Union School—Principal Alexander J. Robb.

Whitestown Seminary—Principal James S. Gardner, Ph. D.

Whitney's Point Union School—Principal T. H. Roberts; Preceptress Mrs. Emma Fiske Roberts.

Yates Union School—Preceptress Mrs. Annie L. Jones; Assistant Ella E. Carroll.

Hon. Matthew Hale, Albany.

Rev. Samuel F. Morrow, D. D., Albany.

Horace M. Paine, M. D., Albany.

Mrs. Anna Parker Pruyn, Albany.

Henry S. McCall, Esq., Albany.

Philander Deming, Albany.

Alfred B. Street, Albany.

Michael P. Cavert, Albany.

Mrs. H. E. McDoual, Albany.

Edward Duffey, M. D., Albany.

Fred. R. W. White, *Evening Times*, Albany.

Charles F. Lewis, Schenectady.

Tayler Lewis, Jr., Schenectady.

Mrs. L. M. Peissner, Schenectady.

J. L. Norris (Un. Coll.), Schenectady.

Rev. C. P. Sheldon, D. D., Troy.

Miss M. A. Barton, Troy.

David H. Crittenden, New York city.

Miss M. Crittenden, New York city.

Joseph A. Munn, New York city.

Joseph Holdrich, New York city.
Mrs. J. Holdrich, New York city.
John F. Gray, M. D., New York city.
George H. Shattuck, New York city.
Charles A. O'Reilly, New York city.
Robert Payne, New York city.
W. W. Monk, New York city.
J. H. Starr, New York city.
J. O'Leary, New York city.
John C. Robinson, Syracuse.
School Comm'r, John Van Voris, Schoharie.
N. L. Button, Rochester.
Eliza Sackett, Public school,———, N. J.

THE MORAL AND THE SECULAR IN EDUCATION.

By TAYLER LEWIS, LL. D., L. H. D.,
Professor of Ancient and Oriental Languages in Union College.

Ἢ θηρίον ἢ θεῖον, says the master mind of antiquity; man must sink to the beast or rise to the divine. There is for him no standing still, no middle way. The animal just fulfills the law of his nature, and therefore it is that he remains stationary; he has no conflict, no struggle between a higher and a lower being. Man has a nature, but he also has the supernatural. By the aid of the latter he rises above nature; by its loss or degradation he sinks below it. He becomes that most frightful thing, an animal with a reason; in other words, a demon, a fiend.

We take this as the pervading idea of the present paper. It is the thought which presents, above all others, the peril as well as the dignity of the human existence. Shall it be overlooked in education? Or is anything entitled to the name that does not recognize, in some way, its incalculable value as an element of culture? Let us be practical here. Experience has abundantly shown that no amount of mere fact knowledge, or of science, in the modern restricted sense of the term, can give security that the man possessing it may not turn out a monster of crime and a deadly scourge to society. It may be conceded that, indirectly, the mere knowledge, of which I have spoken, may have something that seems like a moral influence. As an aid to a higher position among men, it may furnish a motive to correct outward behavior. The same may be said of the pursuit of wealth, or of anything else that gives rise to a worldly prudence, taking the place, for a time, of moral principle. When this, however, is not the case, or such an education gives less distinction by being more and more diffused, then, instead of a check, it may become a direct incentive to crime by creating increased facilities for its commission. Evidence is constantly accumulating that the processes of the burglar, of the incendiary, of the counterfeiter, of the abortionist, of the poisoner, of the railroad destroyer, of the prison breaker, are actually making progress with the progress of

education. They are becoming arts. There is reason to believe that, before long, books may be written upon them. There may be such a thing as a felon's library. And so in respect to mere speculative knowledge. When wholly destitute, as it may be, of moral ideas, it may only wake up the faculties of the soul for the discovery of evil, and make them all the more acute for its perpetration.

MAN IN AN ABNORMAL STATE.

In giving my views on this wide subject, I can only aim here at presenting some very general ideas. There is the great *fact*—so it may be regarded rather than as a tenet or dogma—the great *fact* of something wrong, fearfully wrong, in man. This we may say without trespassing on the ground of Biblical theology, or inquiring into the way and agency of its origin. The editor of the Nation, one of our ablest literary papers, was, lately, discussing the reason for the failure of all rules in political economy. He can only account for it by admitting, to use his own strange expression, that there is, somehow, a "screw loose in man." The language may seem lacking in dignity, yet is it most impressive as well as significant. Humanity is in disorder. I would not use the word *fallen*, because it is desirable to avoid the special technics of any peculiar theology. But there is something wrong in man. His nature has, somehow, received a great moral shock. The appeal might be made to the Bible; but, in such an argument as this, profane history is more likely to be attended to, and its proof is all-sufficient. From the earliest record of our race, the human world has been full of the most deadly evil. Who will dare deny it? Age after age of crime, injustice, fraud, violence, cruelty, have furnished a record which stares us in the face, and forbids all ignoring of the fatal *fact*. Our own, with all its boasts of progress and civilization, furnishes a full quota to the complement of these dark and bloody statistics. Within ten years the most causeless rebellion known to human history has laid waste our own fair land, and caused a sacrifice of more than half a million lives for its suppression. Who slew all these? We inquire not now in respect to the political causation; but great guilt lies somewhere, and should in some way be confessed. The damning fact still remains that this awful ruin, this fearful waste of human life belongs to an age, and to a race, and to a country boasting their superiority to all others. Within a still less period, a most desolating war, breaking out professedly on one of the most frivolous points of political etiquette, has occasioned a still greater loss of human life, dismembering and crushing to the earth the proud-

est nation in Europe, whilst leaving to its antagonist a demoniac triumph, unchecked by the universal mourning within its own territory. Later still, a band of men claiming to be reformers, get possession of a great city already desolated by the horrors of war, and vindictively devote it to fires and slaughter, surpassing all it had before endured. Later still, this many-faced evil shows itself in vile thefts and robberies on the largest scale, perpetrated by men entrusted with the government of our own commercial metropolis. Very varied have been its aspects, but it has ever shown itself the same inveterate disease from the very beginning of all that is known respecting humanity. All along the path of history there have been times and influences that seemed about to furnish some evidence of change, some faint dawning of the prophet's latter-day glory, or the poet's golden age; but how soon have they been found deceptive! The disease has only been taking some other form. Crime has changed its Protean features. Violence has seemed giving place to fraud, or despotic cruelty to political corruption. Civilization brings in evils that balance all its seeming benefits. Discoveries in science have soon been perverted to the introduction of new forms of danger and of crime. Even God's interpositions have been darkened and turned aside from their gracious effects by the inveterate strength of this great moral calamity. For ages has our world been the theater of a mighty war between the powers of good and evil. We are compelled to admit this, whatever we may think of the termination of the struggle, or the agencies divine or human by which it is to be brought about.

The theologian's word for this is depravity. Man is fallen, he says. I would rather describe it here by a word which cannot offend, because it is now so much employed by scientists and reformers in other and far inferior matters. We might say, then, that man is, somehow, in an *abnormal* state. He makes a sad discord in a world for which he must have been designed as the key note. He is not doing that which might have been rationally expected from the faculties given and the dignities conferred upon him. Though endowed with reason, he is living the life of the beast in its essential selfishness and animality, notwithstanding the fair appearances presented by a purely outward civilization. Now, as far as science can discover, everything else in the mundane system is living according to its law. Thus is it in the purely animal world. Every species is doing what God, or, if any prefer the term, what Nature intended them to do. They are doing it well; they are doing it perfectly.

We cannot think this of man. It is blaspheming God, it is blaspheming Nature to affirm that the doings of our race for six thousand years or more, or what they are doing now, even in civilized London, Paris and New York, are the true normal ends of the human existence. Man is not fulfilling his destiny even as an animal. The possession of reason, and the constant jar between it and his animal propensities, does not allow him even the repose of the brute. If the end of his being were merely to live according to nature, *vivere secundum naturam*, as some of the old heathen moralists, as well as a very modern school, have said, he is not doing even that. Hence the strangest anomalies, and, sometimes, the most terrible disorders, arising from the very efforts of reason and conscience to assert their divine prerogatives. Hence it is that, according to the very language of our Saviour, even the blessed gospel comes into the world as "a sword and a fire."

In the emphatic language of scripture, "the whole creation groaneth;" the whole earthly creation, the whole family of man, and the animal world, as "subject to vanity" with him, "groaneth and travaileth in pain until now." This groaning has never ceased. History, literature, poetry, art, politics, have been ever filled with it. It is like the constant moaning of the sea in its deep restlessness. As one in the vicinity of the cataract, or in the midst of the battle-field, becomes unconscious of its ceaseless roar, so the deafened ear, immersed in secularity, takes no perception of this melancholy sound. But the spiritually-quickened organ ever hears it. It would lead to despair of man were it not for the clarion tone of that prediction, more ancient than the Sibyl, louder than any Delphic or Dodonæan utterances—that old, old promise made by Him to whom "a thousand years are as one day"—that, in "the latter" days, still future, far future, it may be, "the mountain house of the Lord shall be prepared on the tops of the mountains, and the many peoples shall flow unto it; and they shall beat their swords into plowshares, and their spears into pruning-hooks, and shall learn war no more; and they shall say: Come, let us go up to the mountain of the Lord's house, and He shall teach us His ways, and *we* will walk in His paths; for the knowledge of God *shall* cover the earth, even as the waters cover the depths of the sea." Among the papers contained in a late educational report there was one earnestly recommending the introduction of newspapers as proper reading for our common schools. I certainly have no desire to say anything against the press or its representatives; but could the spirit of secularity go further than this? Look at the contrast it

forces upon us: the political compaign newspaper to be introduced in schools as the vehicle of cultured thought and diction, of lofty and pure ideas, whilst such sublime passages as I have just now quoted—so full of "thoughts that breathe and words that burn"—the glorious language of prophets, apostles, yea, of Christ himself, must be thrust out as narrow, bigoted, sectarian, hostile to liberty, to elevation of thought, and to human rights!

Now in the rectifying of this abnormal state, shall public education take no part? Shall that fact be ignored without which history is unintelligible, and political philosophy becomes a mass of contradictions? For such a philosophy is founded alone on this very idea, that, in the conflict between the human appetites and the individual human reason, the latter is the weaker power, and must, therefore, be strengthened by the collective prudence, and by every appeal that can be made to something super-earthly, or rising above the blindness and irrationality of the individual selfishness. If humanity *is* in an abnormal state, if there is, indeed, "a screw loose in man," then may we surely say that such a fact must be fundamental in education, and that the political philosophy which ignores it *must* be false from top to bottom.

The design of this paper is to express a few truths, relating to education, in their most general form. I cannot, however, avoid adverting to certain topics of a more special kind, suggested by the peculiar language of a late resolution passed by one of the city boards of instruction in the West, and which is beginning to be adopted elsewhere. It directly forbids the use of the Christian Scriptures, in any way, in its public schools. Not content with this, it declares prohibited "*all religious instruction*" whatever. Have the authors and favorers of this broad resolution ever asked themselves what would be its effect if carried out to the fullest extent its language would seem to warrant? "All religious instruction," say they. This, of course, includes all moral instruction that has in any way, directly or indirectly, any connection with this tabooed subject of religion. Have they really thought what would be left beyond those mere mechanical processes of reading, writing and computation, which are more strictly the means of education than education itself? There is no need of dwelling on this. The mere presentment of this matter is enough for every thinking man who understands how intimately and extensively ideas moral and religious, or immoral and irreligious, are connected with every department of knowledge, and how inevitably the exclusion of the one is the favoring of the other.

Religious Ideas in History and Social Philosophy.

What is history, stripped of everything that has relation to this forbidden ground? What kind of political economy is that into which no moral or religious ideas are to enter, or which has nothing to do with any ethics of Christianity? What is political philosophy, thus denuded? Why, the very questions, what is government, and whence its authority, are fundamentally religious. What is the State? What is true law, and wherein does it differ essentially, from what is called mob or lynch law? Whence comes the right of a majority to rule a minority? Whence the right of the people any more than the right of kings? Whence does government get its power of life and death? What is crime? What is punishment? Is there no difference in our treatment of the burglar and of the victim of the small pox? On what ground does the State assume to punish? Is it for moral reasons in any cases, regarding crimes as offenses against a national conscience which would be injured by their impunity; or is it solely as a proceeding of convenience or expediency? Is there such a thing as a national moral sense? These are all religious questions, and must receive religious or irreligious answers. In short, is the State a mass meeting, coming and going, convening or seceding, just as it may please any part or parts of parts? Or is it "a power ordained of God," in its essence, in its sanction, religious and divine? Is it a whole that did not make itself, and is, therefore, dependent for its authority on a super-earthly power, whatever may be its outward forms? What determines a whole of territory, or a people as an integer; or what social compact, and between whom made, gives power and right *to be a* people, before there is a defined people, on a defined territory, and who are thereby authorized and empowered to contract with each other? These are religious questions, we say, because they immediately carry the mind to ideas higher than those of popular consent. They suggest that God must have something to do with nations, with the origin and ground of authority in governments; that this should be acknowledged as a fundamental truth, and made part of a true political education.

With these wider political relations are intimately connected the social and the domestic. The family is religious. So is marriage. If totally divested of the higher ideas so long inherent, or thus universally regarded by the popular mind, it would not be long before both would become assimilated to the herding of the beasts; even as striking tendencies in our own age and in our own land are rapidly showing. In fact the education that wholly excludes religious ideas

must ignore almost everything that has the highest value for the human soul. It cannot be done; and even if it were practicable, it would be like coarsely ripping out all figures of life from the richest tapestry, thus rendering worthless the whole fabric that remains.

School and Text Books.

No religious instruction! How then are we to determine in respect to books, whether for the primary or the higher departments? We might, indeed, have an arithmetic which had nothing moral or religious about it; but how in regard to reading exercises. What kind of a figure would they present after there had been weeded out of them all religious and consequently all irreligious ideas? This latter word, though carefully avoided in the letter of the resolutions referred to, falls certainly within their spirit, or the reasons given for them. For neutrality involves reciprocity. It is, in other words, the exclusion of everything to which any portion of the community, great or small, may object, and on any ground they may choose to allege as affecting their rights or their consciences. "No religious instruction," says the resolution; the question what is religious instruction being, of course, to be determined by those who make the objection. On this ground they proceed first to expel the Christian Scriptures. The reason given is that "the children of the parents of all sects and opinions in matters of faith may enjoy alike the benefit of the Common School Fund." They profess to be the opponents of sectarianism. But what, it may be asked, are any of the evils of Bible reading to the virulent sectarianism that lies behind this plausible proceeding? "All sects and opinions," they say; but where is the reciprocity? Suppose that, instead of the Bible, it had been resolved that "Combes' Constitution of Man," a book often recommended for schools and school libraries, together with all teaching built upon or assuming its ideas, should be excluded. What an outcry of bigotry, intolerance, "behind the age," etc., would immediately have been raised in certain quarters! What an alarm of Church and State should we not have heard! And yet many parents, very intelligent as well as conscientious parents too, do honestly regard Combes' work as irreligious and demoralizing in its tendency. Why should not they also have their veto? Why are not their rights and their consciences to be respected, even should they happen to be ignorant and unreasonable? Go on with this; give everything its veto on the sole ground of the demand, irrespective of its truth and

rationality; allow of nothing as entitled to respect because of its representing what has long been held sacred, or is regarded as predominant in the best thinking of the community, and thus as having, in the truest sense, become a part of the social mind; sweep away, by this veto power, everything most precious to the best portion of our population, and what would remain out of which a school or reading book could be compiled.

SECULAR EDUCATION.

To some minds, however, all these difficulties are settled by the magic of a word. It is the term *secular*. They use it as though it were a boundary line as distinct as the Ohio. It is a notable example of the way in which men cheat themselves by a word. Attempt to define secular education, what it embraces, what it excludes, and we shall find that hardly a step has been taken in the solution of the difficult problem. *Secular* (sæculum), belonging to the age or *world* in which we live. But we live in two worlds at the same time. It is this duality, and the spiritual conflict arising from it, which distinguishes us from the animal. God has given it to us, this double being, and what he has joined together man may greatly derange, greatly mar, but cannot put asunder. We live in two worlds, we say, the near world, the world of sense, and the great *seculum seculorum* by which the first is ever encompassed and pervaded. We breathe the atmosphere of both, and there is nothing belonging solely to the one regarded as wholly separate from the other.

But take the word *secular* in its lowest sense: we do not thereby escape the difficulty of the rule that requires the exclusion of all controverted ideas. Men differ much about things secular. Political philosophy should be taught in our schools. So all say. Our children should be instructed as to the nature of our political institutions. But men differ in politics. My hearers will understand me as referring not to any mere momentary questions of party platforms, but to principles deemed fundamental in government, such as those before referred to. There may be those among us who do not believe in republicanism. Shall they be allowed their veto on school books that represent the general national character in this respect? Or shall they be told that there is something predominant here, and that such predominance must be respected in the national education? Holding republicanism to be right, we do rightly and wisely in giving our children a bias toward it in early life. We will not listen to the pretentious free-thinking which demands that the young mind should

be kept open in this respect. The few monarchists or the few communists among us must put up with it. A predominant national character is a most conservative element of nationality, and this is not to be sacrificed to *their* abstract right of opinion. The true inference, as it bears upon the other and still greater question, is most obvious. We have a few atheists among us; there are some who believe only in Nature; they are to be treated with all tolerance, but our long inherited Christianity is not to be driven from our schools and colleges on the ground that, in any honor shown to it, there is a favoring of opinions which they do not hold. It is in possession; it must be proved false before it can be summarily ousted in this manner. The parallel is unanswerable. To say the least, we are no more a republican than we are a Christian nation. Long may both these aspects be preserved.

So also do men differ in æsthetics, in art, in philosophy, in literature; various opinions are held in respect to political economy. Not a shadow of a reason can be given why the principle involved, and the veto claimed, have not an equal application to disagreements in these matters as well as to the tabooed question of morals and religion.

THE INTERDICTION OF THE BIBLE A FAVORING OF UNBELIEF.

It is vain to say that the mere exclusion leaves belief in the Scriptures, and in religion generally, just where it found them. Had they never had place in our schools, the case might have presented a different aspect; though even then the question might fairly have arisen: Why should all knowledge of this kind, forming, as it has, such an important part in human thinking, be wholly shut out? There is no disputing the fact, however, that, from the earliest settlement of our country, such culture had been regarded as belonging to the school. Its positive exclusion, therefore, must have a directly positive instead of a mere negative effect. It must give an infidel bias, to say the least, to the mind of every child at all capable of understanding the strange proceeding. Why, he may well ask, is this book so branded with the stigma of exclusion, when everything else is allowed to come in? When we consider how susceptible of impressions the mind is, at that early period, we may better estimate the moral mischief of such a ban. It is idle to talk of the family and the Sunday-school as a remedy for this. In the first place, vast numbers of our children can have little or no instruction in these ways; in the second place, there is to be considered the effect of such a public tabooing in

weakening the power of domestic instruction, even within its own limited sphere. It is morally unfair to place religious truth under the influence of such an open ban. How must it destroy reverence for the Bible at home, when the child sees it so cast out of the school as some noxious thing, dangerous to liberty and "the rights of man." The effect will be increased by the seemingly higher authority which the public character of the proceeding necessarily imparts to it. The lesson there learned will have more influence upon him than any taught in a lesser circle. The Scriptures, all serious truth, he is thus early taught not simply to neglect, but to regard with suspicion. That is the book, says one child to another, whose reading has been forbidden in the school; can it fail to diminish their reverence for it as it is opened for the domestic worship? How readily, too, will this feeling co-operate with that tendency of the young mind which turns to the world of sense, the world of pleasure, away from all that sober truth, some taste for which it so much needs in the first dawn of life. It is thus that the minutest variation, the merest bias, may become an immeasurable angle of deflection. We are to consider, moreover, what it will be when the proceeding becomes general throughout our land, and the association of ideas connected with it has entered into and become a part of the common mind. The public effect must become, in this way, far greater than the domestic; the school must overpower the family, since what we think with numbers, even though it be superficial, has an influence ever increasing in a geometrical ratio. The public school is the place to which our children go in order to learn that which is to be of greatest value to them in life. So it is said; but no mention is to be made there of God, or soul, or any existence beyond the grave. Will not this be decidedly irreligious education, which no play on the word *secular* can disguise?

No Reciprocity.

There is no neutrality, no reciprocity here. The effects, too, are most unequal. It would be difficult to show that belief in a God and a future life is unfavorable even to the best worldly good. The loss in the other case, if it be a loss, is incalculable. One, too, is against the stream of human appetite; the bias to unbelief, on the other hand, concurs with the animal tendency; and thus it is that this slope of Avernus is all the more rapid, all the more unconscious, and, therefore, all the more easy, under the disguise of a merely negative, and, therefore, harmless principle.

Again, there is another reason why there cannot be any true reciprocity in this matter. Religious and moral instruction is, from its very nature, positive and direct. It seeks no disguise. A personal God, a divine law, a divine retribution here or elsewhere; these are positive truths, if truths at all, and can only be conveyed in a positive manner. Hence it is that the teaching of them ever calls out that most dogmatic cry of dogma. But if these truths are not to be taught in our schools, then it would follow unanswerably, on the same principle of reciprocity, that the controverting them in any way, or what might seem such to any man's conscience, should also be excluded. My conscience, says the atheist, my conscience objects to being taxed for the support of schools in which religion in any form is taught; it breeds bigotry and superstition. My conscience, says another party, objects to being taxed for the support of schools from which every form of religious teaching is excluded; the very act fosters unbelief. Why, to say the least, is not the latter conscience as much entitled to respect as the former? Much more may he thus object to anything which, in his thinking, reasonable or unreasonable, has the least effect to undermine faith in what he believes, or wishes his children to believe. Now the great unfairness here consists in this: that whilst religious and moral truth must be presented, if presented at all, in a positive form, the controverting of such truths may come in, and does come in, under every conceivable disguise. Thus, for example, there may be a desire to have taught, as a part of fundamental education, some of those ideas which are least of all sectarian in the true meaning of the word, or which may be regarded as belonging to Christianity in its widest sense: the being of a God, a divine law, retribution, a Saviour, with the related ideas of salvation, an immortal life, another and a higher world, a belief in some way in Providence and Prayer. But no, says the objector, those are dogmas; they can have no place here. The same language is held in respect to the lyceum or the lecture room. We want no theology to disturb us here. But how is it with the other aspect? Any one who has carefully observed the course that is usually taken, especially in that common educational means we style the lecture, knows how the thing is done. There is presented, perhaps, some system of sheer naturalism; the divine name is not mentioned; there seems to be no denial of a Providence, general or particular, but the opposite ideas are, nevertheless, left upon the mind, and in the worst way. From this confused glamour of nature, and causation, and evolution, and the inviolability of physical law, there emanates continually a subtile,

secret influence, undefined and undefinable, yet undermining all faith, and that, too, by a process of which the subject is least aware. He somehow finds that he has undergone a change. Truths held before present a different aspect. Though not a word has been directly said by way of controverting them, he finds belief more difficult. For the young person who has been subjected to this unfair influence, the worship of the family, the instructions of the pulpit have strangely lost their power. Now let complaint be made of this, and the answer is a prompt disclaimer. The lecturer, or the author of the text book, or the compiler of the reading book, replies indignantly that he had no sectarian design. He meddles not with dogmas — not he. It is not theology or atheology that he teaches, but *philosophy;* if any are offended by it, he cannot accommodate himself to their blind prejudices or their narrow ideas. And then, perhaps, he takes the attitude of the persecuted man, and tells over again, for the thousandth time, that very fresh story of Galileo and the Inquisition. The unfairness of which I speak takes another form. The lecturer, or the author freely admitted into the schools, dwells, perhaps, in the imaginative, the æsthetic, or the sentimental region. Still there is a like undermining of old truths, or what is more common, a mean and sophistical taking for granted that they have all been exploded, and can no longer be recognized by men claiming to be intelligent. But no; that is not meddling with religion; that is *literature;* or it is art, or "the higher thinking;" it has nothing to do with dogmas. This disguised spirit of unfairness takes still another form. It goes on to talk just as it would if no personal God existed or were acknowledged. It babbles of development to the utter ignoring of anything like a developer; for there is no fact induction that ever reaches such a power, and out of this we can never travel. Is an objection made by the religionist, the answer is ever at hand: this is *science*, and it cannot help your dogmas. Science deals alone in facts, and must draw its conclusions therefrom; though the facts known be still, to the facts unknown, like a single leaf to the forests of the Orinoco. Science has to do with "the things seen;" it meddles not with that region beyond sense, and beyond reason, where faith has its dwelling,— a very respectable thing, doubtless, but, belonging to another sphere. It would be unscientific, he says, even to think of answering objections coming from such a source. I appeal to every observing man in my audience, whether the sketch given is not a fair statement of the way in which, under this negative pretense, the bane of skepticism is

allowed to pervade our social education, whilst the antidote, if a certain view becomes established, is wholly shut out.

Education must Acknowledge what is Predominant.

It may be said that I am only stating difficulties without pointing out any way of settling them. But much is gained if there can be produced a conviction that there are such difficulties, and very great ones, in the way of all such innovations on prevalent ideas, and all such attempts at setting up vetoes against what is predominant in a community. When it is generally understood how closely moral and religious ideas are interwoven in the whole fabric of education, and how impossible it is to map out what may be comprehended in that vague word secular, then may there be discovered, perhaps, some basis on which these difficult questions may rationally rest. It may set our best and most candid minds to thinking whether there may not be some compromise grounded on the acknowledgment of something predominant in our religious and moral ideas as well as in our politics and in our social economy. It would be well worth our keenest study to discover whether we cannot have a system of public education unsectarian in its spirit, free from all intolerance, and yet embracing those great spiritual ideas without the recognition of which no government can long exist, and that general Christianity which is as much a national characteristic as the republicanism we profess, or the language we speak. This *must* be discovered, or the whole idea of State and national education must be abandoned. The word *secular* will never solve the mighty problem.

The Idea of Another Life an Essential Element of Education.

Permit me to return again to that great question respecting the true normal or abnormal position of humanity, which was barely touched upon in the introductory remarks, under that head. The selfish principle in man, the worldly or secular principle, needs no aid. It is strong enough already; too strong, as the whole history of the world has shown, as our own history is now most unmistakably showing. It needs some counteracting power. In describing what this is, I would avoid, as said before, all technical theological language, as far as that can be done without a cowardly compromise of truth. This counteracting power is to be found in an idea, not so much dogmatically taught as assumed to be fundamental in education, ever present in its primary as in its highest instructions. It is the idea of another life for man, a stage of existence higher, grander,

vaster, immensely exceeding, and to which the present is but the introduction as of a narrow porch to a temple infinitely wonderful and sublime. It is the idea of a state of being having infinite glories, and, therefore, from the very nature of things, attended with infinite perils. Aside, however, from any fear-inspiring retributive ideas, there is, in such a thought of a vast existence, taking early possession of the soul, and abiding with it so as to be in some sense a part of its life, constantly present in its influence even when not a direct object of consciousness,—there is in such an habitual idea, we say, an elevating, enlarging, purifying power, that makes alien and repulsive the very thought of crime, and gives the indwelling conviction that the worldly, the gross, the low, the sensual, the animal, is somehow unworthy of a being who has ever before him such an immortal destiny. It operates as a vital influence rather than as a fear, a motive, or even a reason. It is a *power*, to use the remarkable language of the apostle, "the power of an endless life"—*δυναμις της ζωης ακαταλυτου*—of a being that cannot be broken. The opposite influence, as said before, is strong enough in itself. Selfishness, worldliness, secularity, the spirit of the age, need no aid from education to develop their growth or those physical utilities on which writers of the Buckle school are ever insisting. It is the other principle which needs the earliest and most assiduous nurture. Socrates saw that when he said: "If the soul is immortal, then is it the great object of our keeping, and that, too, not only for this time we call life, but for that far greater existence, the *all*, the great *whole* of being; for noble is the prize and great the hope." We think of one wiser than Socrates, and who said: "What shall a man give in exchange for his soul?" The endeavor here has been to set this forth in the most general, or undogmatical, way, and yet without any compromise of its incalculable value. It is not as a remote good at the far end of the lever supposed to outweigh a near temptation, but a great idea early implanted, ever filling the soul, and preventing that false magnifying of present surroundings which so obscures everything else in the spiritual horizon. I am immortal, and, therefore, to do this were unworthy of the vastness of my being. There is only one other reason that transcends it. It is the language of one of old, in the dim dawn of ethics, or when moral ideas were but in embryo, as Lubbock and Buckle would say: "How shall I do this and sin against God?" But the thoughts are essentially related as grounded alike on the idea of eternity; and to him who habitually holds the one the other is ever very near. Shall we listen to the men who call such

teaching sectarian, and, therefore, refuse it all place in education? To this there is but one answer, in which all must agree who have the least shadow of a title to the name Christian. Compromise may be carried far; but there must be some stopping place. There are some things bound up in the very life of civil society. No amount of atheistic clamor, no desire to conciliate the atheistic sect—for sect they are, and a very intolerant one, too—should, for a moment, permit the thought of banishing from our schools an idea so fundamental as this. It needs not to be taught as a dogma—to give it the odious name that some are so fond of using—but to be laid down rather as a starting principle which alone gives value to every other kind of knowledge, as the vitalizing truth most conservative of the political well-being, as the ennobling doctrine without which the present world becomes a dream, an inexplicable enigma, and all that may be called "the rights of man" disappear in the going out of that hope of immortality which elevates man above "the beasts that perish." An easy analogy will aid us here. What would we think of that education of the child which should be so extremely childish as to have no recognition, not the least intimation, of his coming manhood? *A fortiori*, then, *atque a fortissimo*, must that education for the adult youth be irrational, beyond all measure of irrationality, which positively forbids all reference to that higher manhood of which the present life is but the opening stage.

It is indeed a most practical position which is here contended for. What remains of virtue there are in our sin-disordered world are inseparable from such an idea. Faint as it is, weak as it has always been in opposition to the strong worldly influence, still it is this feeling and this idea that give to the human soul its sense of spirit worthiness. It is this that makes it the most efficacious check to crime. It is the only thing that can give force or meaning to that misleading phrase "an enlightened self-interest." A present advantage, a present temptation, whether of appetite, or avarice, or ambition, fills the mental horizon, blinding the mind to every other consideration, and surprising us often by the suddenness of the transgression to which it leads. Hence the explanation of a fact by no means infrequent, and yet at every occurrence calling out our wonder, as though it were some inexplicable phenomenon. One who has heretofore stood most fair in the public estimation, suddenly falls into crime. He commits some violent outrage of which no one would have thought him capable, or some gross fraud or malfeasance which seems wholly alien to the character he has heretofore borne; or after having long carried the

name of "the honest," he suddenly belies it by taking a course which for years has fallen under his own unsparing condemnation. Such persons are not sinners above all the Gallileans. Strange, indeed, and puzzling are their cases; yet they occur often enough to fill us all with fear and self-distrust. How could he have done it, we say. The explanation shows the fallacy of a wholly secular morality. In some unguarded moment, a near present advantage has so suddenly enlarged its appearance as to overpower the thought of any remoter worldly good. Character and standing are thrown in the back ground. The whole power of a merely secular ethics goes down before this new and blinding force. The man falls; and before our newspapers have ceased to make a wonder of it, there is a similar case to crowd it out of notice. How could he have been so blinded, we say; an enlightened self-interest should have prevented this. But alas for the secular virtue; its weakness is in proportion to the confidence of its trust; selfishness, of itself, whether refined or gross, or the idea of self taking in only the present being, is in itself essential darkness. It cannot, of itself, enlighten or be enlightened. Its very nature is to blind and bewilder the judgment in respect to the true good. It occupies itself with shadows and spectres deceptively seen in the distorting mists of a near present magnifying them out of all true proportion. The only cure for this, the only way to make it a truly "enlightened self-interest," is the early education of the soul to the habitual keeping before it of the great future, the "great all of being," as Socrates calls it. It needs to have ever present this vastness of the human existence, so as to counteract, by its appalling infinity, the effect of present temptation having its strength in its nearness, and in its immensely magnifying power. To bring nigh the great and the distant, to abate the undue influence of this near world of sense, this sea of secularity that is surging around us, and sometimes suddenly going over our heads with its darkening floods of evil,—this is certainly an end of education, and a most important one, if regarded only in its higher spiritual effects, or its influence in saving the mind from the narrowness and belittling power of mere earthly ideas. We prefer thus to leave it, instead of giving it any closer connection with other views on which men may differ, such as the nature and extent of retribution in another life, the methods of redemption, and the special views of the divine associated with them.

In our most modern idea of the school as excluding all religious ideas, the tendency must be strongly and inevitably all the other way.

This *dunya*, or near world, as the Arabians call it, fills the whole circle of vision. Present success in life, wealth, business, office, political power, in a word, worldly good, is held out everywhere as the end of our secular education. We need the counteracting idea of the infinite future, of the infinite all of being. It is the want of this which warrants us in calling our education animal, even in its highest or most scientific pretensions. It is animal in that it is only for the present. It is because of their having no idea of a great future that the brute races cannot be truly educated. The animal lives in the present; for this was he made. He has no spiritual conflict; he never resists a present appetite; he has no conception of any power or reason for so doing; he was not designed for any such purpose. Man, on the other hand, is intended to war with nature, and thus to rise above it; it is the human probation, the human discipline for the higher sphere. The system of exclusively secular education teaches the directly opposite idea, as we all know; but whether, in proposing to himself such an aim as the only end of his being, man truly conquers nature or is conquered by it is the question which yet remains to be solved.

On the other hand, there is strong ground for saying that this counteracting tendency of spiritual culture is the only thing which can make the highest civilization a blessing instead of a curse. It is the only power which can prevent it from falling into that circuit of excessive worldliness which such a secular spirit, without this correction, ever engenders. The history of the world shows that no genealogy is more sure. An irreligious civilization begetting an odious selfishness, selfishness begetting a blinding secularity at war with every elevated idea, worldliness engendering crime and sensuality in their most revolting forms,—of these are born cruelty, caste, disruption of social ties, unnatural passions, inhuman ferocities, and thus the age comes round again to that animal barbarism of which it professed to be the antipodes. It may take new forms, but it is only a more hideous animalism after all. It may make a show of science and philosophy even, but it is still the wisdom so expressively described by the apostle as "earthly, sensual, devilish." The thought cannot be better expressed than in the remarkable language of a serious heathen: "In such a wheel of sequences," says Longinus, in his treatise on the sublime, "in such a wheel of sequences, it cannot be but that, by little and little, there comes round a decay and corruption of human life; all spiritual greatness, too, must fade away when men boast only of the mortal and the

earthly, or are occupied solely with admiring and praising these, whilst neglecting the growth of that which pertains to immortality." Such must always be the result of a godless enlightenment of the mere worldly mind, or of what would be called an exclusive secular training. For the best good even of this world, in its most secular aspects, we cannot keep too high and too pure the thought of another. Man must degenerate when there is no idea predominating over that of the present life. Where this has become dim or gone wholly out, there no degree of wealth, or civilization, or even of literary refinement, can stay the march of crime, whilst science itself may become one of the chief means for furnishing facilities to its progress. When, on the other hand, the spiritual good takes precedence, the worldly welfare will certainly follow in its train. "He that would save his life shall lose it; he that would lose his life shall find it." It is as true of ages and communities as of individuals. Is a generation, a people occupied pre-eminently with the ideas of another life, the habitual contemplation of our greater being? we could say with the utmost confidence, such a generation would not be squalid, it would not be unclean, it would not be oppressed with debasing poverty. Luxury it might want; in many of the elegancies of life it might be deficient, but poverty as well as vice would be in a great measure unknown in a community where the ruling thought was the timeless value of the spirit, and the highest political duty recognized was that of providing for the education of the immortal being.

Concluding Remarks.

I have ever regarded this University Convocation as a school of thought, rather than as a fashioner of educational measures. I therefore offer no apology for presenting to it a paper which deals mainly with general or abstract ideas, and that, too, on a matter which some might regard as excluded from our consideration. I am aware, too, that I have been occupied with the description of difficulties rather than the proposal of any practical measures. There are, however, two grave questions, practical too, as well as grave, which I would present to this assembly of thoughtful men. The first concerns the successful finding of this neutral line, this purely secular region of which some speak, as though it presented no difficulty. It is the practicability of determining the process by which all that is religious or irreligious in its nature or tendency is to be eliminated from education, without reducing it to those bare mechanical exercises which are unworthy of the name. The second question would be, whether this neutrality,

if such a line were theoretically found, could possibly be preserved. Can the State really be neutral, and continue neutral, in these great matters, any more than the individual? Can it refuse all favor to religion in its most fundamental ideas, without favoring irreligion? And this suggests another and deeper form of the same question which, in this age and in this country, we are especially called to look directly in the face. Is not that which calls itself no religion in fact irreligion? In other words, is it a mere negation, a mere vacuum of religious ideas, as it assumes to be in its claim to neutrality? It is the very nature of some ideas that there can be no neutrality in respect to them. Their antithetical terms, as furnished by the instinctive logic of language, are not negatives, but carry with them the sharpest and most positive of logical opposites. As, for example, the Latin *inimicitia* does not mean, simply, not friendly, but the most positive enmity, and *immitis* not, simply, *not mild*, but the most relentless cruelty; so irreligion, when analyzed philosophically as well as etymologically, is not a mere indifference, it is not a mere negation, but a most positive entity, a most assertive idea, a most aggressive dogma, more intolerant in fact than any form of sectarian bigotry. Blind indeed is the man who has not seen the evidence of this, as it has displayed itself in our own country, and lately took a visible demoniac form in the Commune of Paris. The question is barely presented here. It cannot be denied, however, that it is one intimately connected with any discussion in respect to the duties and the limits of national education. It suggests, too, the thought whether any amount of concession to this positive irreligious spirit, this most aggressive of all sects, will ever lessen its demand, until every moral and religious idea, every thought that has a relation to a God above, or to a world beyond, or to any divine government, or to any higher law than human wills, shall be wholly swept from our schools, highest as well as lowest, from our legislation, our jurisprudence, our domestic institutions—so far as they are acknowledged by law—in a word, from our whole social and political life. It is a fearful question; yet must we not shrink from an attempt at the solution. Woe unto us if we cannot solve it, if we cannot compromise on certain great religious truths, and say unto the few who may be hostile to them: Further than this we cannot go; they who demand their rejection from our schools may have all toleration given to their individual belief, but they cannot be allowed an excluding veto.

What are these great religious truths that may be regarded as forming such a basis? May the speaker be pardoned for making the

attempt to set them forth in their most general form. They may be presented under four heads: 1. A personal God, ruling over worlds, over nations, over individuals. 2. A divine law, conceived as the basis of all morality, whether national or individual. 3. Man an immortal being with immortal responsibilities. 4. The idea of Christ as the teacher, the Saviour, the true light and life of man. The first three belong to the very essence of religion, even as acknowledged by heathen nations. The fourth is the idea, expressed in its least dogmatic form, without which no man, no collection of men, no nation, can be called *Christian*. Here may we take our position. Beyond this no religionist should wish to go; short of this no compromise can stop. A more minute inculcation is for the pulpit or the family, according to the denominational view, but these outlines are the rudiments of a Christian State. They cannot be yielded without yielding all for which the State has any value.

The question must soon be settled. The crisis is coming, and along with it, if settled wrong, another decision from which the Christian must not shrink. It involves his tenure of citizenship. When the voice of the State banishes all such ideas from its education, then should he hear another voice saying: "Come out of her, my people." In the school where Christ cannot be named he can have no part. In the land where it is forbidden, he may continue to dwell, but only as an alien. He may submit to the tax collector, even as Christ paid tribute unto Cæsar, but he can give no vote, he can hold no office, no citizenship, in a State, so called, which, in its education, in its legislature, in its jurisprudence, openly avows that, as a State, it knows no God, no religious idea, no superhuman sanction of the authority it claims to wield over the millions now living and the generations yet unborn. Such a State is not simply neutral. It is not simply not-Christian, or un-Christian, but *anti-Christian*. One who believes Christ when he says that what is not for him is against him, can have no membership in such a godless structure. Make religion unsectarian—it can be done—but there will still remain ideas in respect to which neutrality, or indifference, is simply a thing impossible. It must be, eventually, religion or irreligion. When this is fully understood, then are we prepared to form some estimate of the greatness of the question I have ventured to present to this Convocation. Whilst no decision is expected, some service may have been rendered in bringing it before the minds of thoughtful men, who, though aware of its great difficulties, cannot regard it as alien to our discussions.

WHAT SHALL WE DO WITH THE BOOKS?

By Charles H. Crawford, Principal of Almond Academy.

The wisdom of one generation, with a little brushing up, minus a few false notions, plus a few newly discovered truths, constitutes the wisdom of the next. Books are the records which preserve the wisdom of former generations and make it available to those that come after. Every new fact that is added to the general stock of information is made known to mankind through the same instrumentality. From books, then, must be obtained a very large portion of our necessary knowledge. There is, therefore, no question as to the way books are to be used by the student after leaving school; he will then consult them for the information he may need for the prosecution of his business. But, with reference to the use that should be made of them in school, the question "What shall we do with the Books?" is much discussed. The first and most natural answer is, that they should be used as a means of storing the mind with such knowledge as will be useful in after life. But it invariably happens that, while very much knowledge that is not obtained in school is needed by the student in after life, comparatively few of the facts he does learn are ever of any use to him. To remedy this apparent misdirection of energies, certain self-styled practical men have attempted to teach just the things the student is to need in after life, and nothing else. These teachers have met with, to say the most, but partial success, owing to their lack of the spirit of prophecy.

It is impossible to know just what items of information a class of students will need for their life work, except that each will probably be called upon to read, write and cipher; beyond this, no two will need precisely the same. It is, therefore, evident that the stock of information obtained in school cannot be made up of just the items the future life will demand; so the student cannot leave school with all the knowledge he shall need for his life work. The largest possible stock of the most practical knowledge will be insufficient. In all he may have acquired, there is but little that will be necessary to his success in the calling he may choose. Nor is it possible for him ever

to attain so much that emergencies will not continually arise which demand more. No one man, in a single lifetime, much less in the short time allotted to school days, can acquire a knowledge of all the laws and decisions applicable to the infinite variety of cases continually arising in our courts of justice; or of all the diseases liable to afflict the inhabitants of a single neighborhood, and their remedies; or of all the moral and religious truths which the faithful minister will need to pit against the ever-varying forms of error that will spring up in his field of labor; or of all the facts he will need to follow successfully any other calling; for there is no prophet to foretell for him just what the emergencies that must arise will require him to know. Even were it possible for him to attain all the knowledge already developed in the field he is to occupy, new truths, demanded by the exigencies of a later day, are continually being developed. These he must be able to draw from books, for when a new truth is discovered, usually but one man is the discoverer, while all others must learn it from the books in which he publishes it.

When a new and complicated case is presented, the lawyer goes to his books, and, if he knows how to use them, enters the court-room, armed, by a few hours' study, with just the knowledge he needs. When the minister is called upon to meet new forms of error and wickedness, he seeks from the sacred writers and their commentators, and from history, for the truths and examples with which to meet them. The physician, when a new form of disease arises in his practice, must search his books for a knowledge of it and its remedies. With them all success depends, in a large measure, upon the ability to secure just the knowledge necessary; and the one is most successful who has, in each emergency, just the knowledge he needs, and is best able to use it; and it makes no difference whether the knowledge was obtained during school days, or half an hour before it is needed, so it be exact, ready, and well used. In fact, a large and very important part of the knowledge necessary to success in any profession must be learned from books just when it is needed. It is of importance, then, that the student, just leaving school and entering upon his life work, be able readily to draw from books this necessary knowledge, when the occasion demands it.

"Knowledge is power," says the old adage; but it is the ability to use knowledge, and not the mere possession of it, that makes a man powerful. That student who goes forth to his work with such a mastery over books that he can readily avail himself of the information they contain, has control of a vast amount of knowledge, which,

rightly used, is power. This mastery over books can and should be acquired in school. In other words, the student should be taught to use books in school, as he will need to use them after leaving school. This cannot be done by requiring him to memorize so many pages and so many sections each day, for that is not the way he will use them after his school days are over. From this memorizing process is gained the power to grasp and retain; but this, important as it is, is not sufficient. In the busy life for which our pupils are preparing, there will be no one found to mark the pages that are to be conned each day. There, all are learners, but each must assign his own task as well as learn it. The reason why so many of those who go forth with the highest culture of the extended college course, go forth to certain defeat in the battle of life, is that they are unable to assign themselves new tasks; and so are obliged to depend solely upon the knowledge gained in school, which is never sufficient.

If our object cannot be accomplished by requiring pupils to memorize the contents of books, much less can it be accomplished by depriving them of books, as some new theories of education demand, no matter how good the methods that may be substituted. Pupils can learn to use books as they must be used after leaving school, only by using them in the same way in school; they should be given work, the knowledge necessary for the accomplishment of which they must find for themselves, instead of having it doled out to them by the page. I do not say that all our teaching should be conducted on this principle, but enough of it to secure the desired result; just as, if we wish to cultivate the memory, we cause the student to memorize, and if we wish to cultivate the reasoning powers, we give him problems, the solution of which he must find for himself, without the aid of books.

In the usual routine of school work, that which gives the best training in the independent use of books, is the study of languages. The translation of a passage from another language into our own, requires from the student a search through grammar and lexicon for the knowledge necessary, and this search for the knowledge to be gained, gives a greater independence to habits of study than the mere memorizing of stated portions of a single text-book. And this, more than anything else, makes the study of Greek and Latin valuable.

The assigning of lessons by subject, instead of by pages or sections, is a step in the right direction. To reap the full benefit of this, the student should not be confined to one particular book, but should be required to prepare for recitation from all the books within his

reach on the subject; just as the teacher would prepare himself, if he were to teach by lectures. This plan may very profitably be combined with oral teaching, the student being required to supplement the lectures of his teacher with such knowledge of the subject in hand as he can gain from books. But there is still another step to be taken in this direction. Our more advanced academic classes should be given some subjects to prepare for examination without the aid of class instruction and recitation. The points each examination is to cover should be definitely stated at the outset, and the pupils should be required to prepare themselves within the given time from all the books within their reach.

Our object may be promoted by requiring essays on subjects which the student will need to study before writing. The subject of history may thus be mastered. Pains should be taken to give such a course of subjects as shall lead to a systematic course of reading. The study of history in schools has often been found unproductive of good; hence some have thought that a knowledge of it would better be acquired by ordinary reading. But it is very difficult to induce pupils in school to read, and if they do, a mere perusal of historical works is insufficient; while reading for the purpose of using the facts read in a composition must be effective.

My answer, then, to the question, "What shall we do with the Books?" is this: Require pupils to use books in school as they will need to use them after leaving school, that they may learn how to use them. I am aware that during a term's study in this way, the student will not have learned so many facts concerning the subject in hand as he would by memorizing a text-book, but he will have gained such ability to acquire the facts he will need to know in his after life as will more than compensate for this apparent loss. This loss need not be regretted; for not the largest knowledge of the contents of books, but the greatest ability to draw from them, in every emergency, just the knowledge needed, is the best "book learning."

THE RELATIONS OF THE SCHOOLS OF THE STATE.

By Oliver Morehouse, A. M., Principal of Albion Academy.

To speak or write upon the relations of the schools of the State, an unlimited range is afforded. These relations embrace not only their connection with and dependence on each other, but their bearing upon the intellectual development of the varied classes of individuals affected by them—their relation to the social, commercial, political and religious interests of the State, and their relations to the same interests and schools of other States. Indeed, the schools of our State hold an important relation, immediately or remotely, to every human interest. Other topics than merely these relations might, perhaps, more profitably occupy our time; as for example, the obligations arising from them. But, first, these relations must be considered before the obligations can be understood or fulfilled. What I present you on this occasion will pertain mainly to the relations of the schools to each other, and then, with the indulgence of the Convocation, an inference as to the action the relations found to exist, make imperative upon those having the schools in charge. The schools sustain the relation of primary, and advanced or higher, the relation of supply and demand, of inspiration and action.

The common or district school is primary; it is the supply school, the inspiring school. It is in this that the material is taken in its rudest form, and the first elements of mental culture are instilled and brought into action. It is here where the child-mind is first inspired with thought and desire to think. It is here where preparation is begun for the next room in the great workshop of intellectual men and women of the State. The workmen in the next room would remain for ever idle but for this preparatory room. The district school holds another and a much more important relation to the higher schools. In the common or district schools about ninety per cent of the entire population of the State receive or take on all the school culture they ever have, never attending any other school. This statement may seem extravagant and doubtful, but it is the result of a somewhat careful examination of the subject. These

primary schools look with propriety to the higher schools for instruction and guidance, inasmuch as they have given to the higher schools the products of their work. And these primary schools claim the best, the most thoroughly qualified the higher schools can furnish, as in this home, this district school, ninety per cent of the children are to enjoy their only school advantages. Here is seen the relation of dependence and resource, the relation of supply and demand.

The district school supplies the higher school with pupils and demands instructors. The higher school, the union school, normal school or academy, supplies teachers and demands pupils, and is just as dependent as the district or primary school. These relations being mutual, their proper adjustment and free action should never be hindered, but carefully fostered, guarded and encouraged. The acknowledgment of these relations, in the conception and execution of the various plans to meet the obligations arising from them, will be referred to by the children of the State, and the friends of universal human culture, as one of the wisest acts on the part of educators and the Legislature, to be found in the records of our educational history, and the placing of academies on the same basis will be the next. A necessity existed, and teachers' institutes and teachers' classes were created, organized and sustained by legislative enactment to meet the requirement. Much was accomplished through these instrumentalities. I have given direct instruction upon the theory and practice of teaching to more than sixteen hundred young men and women in institutes and normal classes connected with academies, a very large majority of whom have taught with fidelity and success. Other teachers have, no doubt, taught many more.

These agencies did not meet the necessities. The relation was still pressing. More and better teachers were required, and the normal schools came into being. The object for which they were created and organized was noble, one of the noblest that ever moved the soul to action. If further legislation is necessary to render the work of these schools available, by securing the *absolute service* of normal graduates in the districts of our own State, let the Legislature come boldly to the work, and make the conditions of attendance and future teaching positive. Let the standard of qualification be elevated, so that no indifferently qualified teacher can find a place in a backward school, forever keeping it backward. I insist now, as I did two years ago, that the most backward pupils need the best qualified teachers to rouse and inspire them to thought. Let the Legislature place the

academies upon the same basis as the normal, union and district schools. Let all be *free*, conditioned upon the completion of a prescribed course of study, suited to the relations each sustains to the other in the common schools, and also to the college. And here I am reminded that I have yet to say a word relative to the relation of the primary and middle schools to the colleges and universities.

These must be supplied, if supplied at all, from the fitting or preparatory schools. How near and interesting the relation existing between the academies and colleges! Shall it be dissolved? Shall the academies be abandoned? Shall the colleges cease to look to them to fill up the ranks, thinned by successive graduations? No! As I said before, let them be placed upon the same basis as the other schools of similar grade. Let them be *free*, free by legal enactment, conditioned upon the completion of a prescribed course of study. The relation of schools of the same or similar grade is disturbed when one is free and the other requires remuneration for the same service. The relation of the academy and normal school to the college is very nearly the same as that existing between the district school and the academy and normal school—so that while a full college course is acknowledged to be a good thing, and even a necessity, the fact that the college depends upon the academy and normal school for patronage may not be ignored.

It is believed that while the academies are conducted as they have been and look for support from tuition bills and the appropriation from the Literature Fund, very few scholars will be found preparing for college. This belief is based upon actual results during the past five years. The academic departments of normal schools will do a part of this work and do it well; but the few normal schools engaged in it cannot meet the demand for the whole State, or any considerable part of it, whether tuition be charged in the academies or not. As members of the normal department or class pass through the entire normal and academic courses without expense for text-books or tuition, and as they are *pledged* to *teach*, they will not be very apt to take a college course, or to make special preparation for it.

It is a great step in advance to make the common union and normal schools free; while it was the duty of the Legislature to do this, it seems to me it ought not to have left the other duty undone, viz., to make the academies free also. Do not the multitudes living in the neighborhoods of academies need their advantages? Shall we have, *can* we have, the mental culture and the training for the college course without them? Will the masses in the rural districts be lifted up and

advanced by the withdrawal of this middle-school influence? Can the State afford to dispense with this power that gives, on the one hand, through the college and university course, a disciplined, leading mind, and, on the other hand, persons qualified to instruct the hosts, the millions of children, so that they may intelligently and safely exercise the power secured to them by organic law to call into public service those more cultivated and favored? Is there not a disturbance of the true relations of school to school? Have we a perfect system of schools in our State? Is our system harmonious? Has not the spirit of rivalry, hostility, antagonism, come to exert a blighting influence?

All our schools, from the lowest to the highest, have, or should have, the same general object in view; and if one needs and deserves State aid, the other does also. The principle is one, the work is one, the workers should be a unit; and all the workers should be thoroughly qualified for the place and work assigned them. As to the methods of teaching, the teacher must be competent. He must *know* what he is teaching, and *know* that he knows it. Teaching must be living. The teacher must burn with enthusiasm. He must give his teaching a living character by bringing it into connection with all collateral knowledge—geography, history, mythology, and philosophy, in its true signification. All should be tributary to it, while it must not be forgotten that classical culture stands inseparably connected with all liberal studies. There is one other relation of which I wish to speak, viz., that of English schools or classes to German, French and Chinese classes or schools. That the English branches—the English language—should be thoroughly taught, is self-evident. That all the branches pursued in our schools should be taught in English, is equally evident. As we love and cherish our own country and its institutions, so we should Yankeefy, Anglify and Americanize all that comes to our shores, whether it be language or men. Our children should master the English language in its roots, trace out the affinities of these roots, and be prepared to connect facts into principles, and qualify themselves to pursue all branches and all knowledge. Knowledge, thus acquired, *is* knowledge. What we require of our children, what is good for them, is good for the children of foreigners, and should be required of them. Had I control of the treasury of the State or Nation, not a dollar should be paid for giving instruction in any living foreign language, when the object is to qualify persons to extend its use in our country. Not but that there are advantages to be derived from them in obtaining nice shades of meaning, etc., but these

advantages sink into insignificance in contrast with the damage done in hindering the progress and perfection of our own language, so well adapted to give expression to every thought and emotion of the heart.

The theme of this paper is prolific of discussion; and while I have presented very little if anything that is new, yet I remember that our present object is not novelty, but truth, and truth less for speculative than for practical purposes. The duty of education presses anew upon each generation, just as if nobody had ever educated or been educated before. Therefore, each successive teacher, school and generation must have individually living convictions *of* and living interest *in* the relations and the great truths with which each deals. The moment that a system, whatever its original excellences, becomes stereotyped and fossilized or antagonistic in its parts, the moment that it becomes a matter of tradition, and is adhered to, not as supplying the felt needs of the present, but only as a bequest, no matter how intrinsically precious, from a buried past, that moment it becomes, so far as any practical use is concerned, "a dead-head," and the sooner it is decently buried and replaced by a system grounded on conscious wants and living principles the better. Each successive company of educators must be fired afresh with the spirit and trained anew in the methods of their works.

ACADEMIES AND THEIR WORK.

BY JAMES M. SPRAGUE, Principal of New Berlin Academy.

Notwithstanding the triteness of this subject, all will admit that in it abide the germs of individual growth and national development. To treat it at a length commensurate with its real importance, would be to call forth all the wisdom and genius from the days of Plato to the present. To sketch briefly the relation of academies to other schools, the variety and amount of labor required of them, is all that can be expected of a limited paper. A school of some kind seems necessarily to be a concomitant of civilization, paving the way to fairer fields and more abundant harvests. As early as the year 1784, at East Hampton, Suffolk county, in this State, Clinton Academy, the first, and, at that time, the only institution of the kind in the State, was founded. The trustees of this institution, through a petition to the Legislature, suggested the propriety of a general system of supervision, which led to the enactment of a law, passed April 13, 1787, organizing the Board of Regents of the University. Clinton Academy and Erasmus Hall, a similar institution, located at Flatbush, Kings county, were legally incorporated November 17, 1787, and were the first two legally organized academic institutions in the State. This number has been increased, under the wise administration of that honorable board, to meet the necessities of a growing population; and now, instead of two, we have two hundred and nine like institutions, diffusing their educational light through every portion of the State, and furnishing, at this time, needed educational advantages to over 30,000 students. These institutions engage the talent and ability of nearly or quite 1,100 teachers, at least two-thirds of whom make teaching a profession, consecrating their energies and their lives to this excellent work. Surely such a grand educational power, working solely in the interest of our youth and of humanity, cannot fail to elicit our tenderest sympathies and most generous support. The work of these schools seems to be threefold. First, they are expected to prepare boys for college; hence they are a sort of intermediate or preparatory school, or stepping-stone between the common school and the college or

higher university. Second, they are to supply our district schools, in a great part, with *qualified* teachers. Lastly, they are to furnish a course of study to a large class of students, who are to end their school days at the academy, contemplating neither a college course nor teaching. These are to become our intelligent husbandmen, merchants, mechanics, legislators, and even professional men of the day; these are to fill places of trust and honor, and will stand, as they have ever stood, in the foremost rank in the development of their country's resources. Now, for a principal, with two or even three assistants, at the beginning of a term, to be confronted with such a multiplicity of topics as the above-mentioned courses will suggest, is to surround him with more or less of bewilderment. Supplement with surveying, trigonometry, commercial course, music, drawing and numerous others, and the real work of academies is most meagerly portrayed. You say at once, so few teachers cannot properly hear such a variety of classes. We grant it; but what is the remedy? The reply is, procure the services of another instructor. This, financial affairs totally forbid. In this dilemma, the last and really worst alternative is to cut down the time for recitation. Even then time may be wanting, perhaps, for two classes, one of which will be heard in the morning before class time, and the other after, or in the evening. With labor so varied, so onerous, so pressing, the teacher's task is not as thoroughly or efficiently performed as he could desire; and no one regrets more sincerely than he that this alternative has been forced upon him.

Our established system of education is broad and comprehensive, forming a complete series, viz.: the common school, the academy, the college. Their relationship is most intimate and mutual, each depending wholly or in part for its vigor and growth upon one or both the others. When this plan shall have been fully considered and the duties of its several gradations become clearly defined, it will be so complete as to be fully adequate to satisfy all the educational demands and necessities of a progressive and free people. But under the present regime there is continual friction and delay, arising in part from the fact that colleges and academies are teaching the same branches; and the latter are doing work in the elementary branches to some considerable extent. The work of common schools, as connected with this subject, to which I shall hereafter advert, is well understood. Its ultimate purpose is to furnish thorough discipline in the primary and elementary studies, beyond which scarcely one in fifty ever advances. The academy is to take the few who

desire a more extended course, and raise them to a higher and more advanced standard of learning, the better fitting them for life's duties, or rendering to those advancing to a college curriculum such helps as shall be of practical utility through the rest of their educational course and through life. Thus far along on the highway to profound erudition, it remains for the college to do the rest. The importance of this intermediate position in our growing educational system, held by academies, should not be underrated, nor can it be overrated. Colleges and all other higher institutions have long recognized and acknowledged the fact that their supply of students must come almost wholly from academies. In fact, there are but few other schools which claim to prepare boys, in any manner, for studies usually pursued during the first year in college. Hence, whatever of literary impulse or benefit an academy or community receives from the energy and labor of a competent and thorough teacher, the colleges share to the fullest extent. The highest interests of education, the better support of all means and appliances to extend the same, and the greatest possible good to mankind demand for academies that qualification and tact, in the person of the principal, which characterizes and constitutes a true educator of youth. Again, besides furnishing a good drill in the elementary and fundamental branches, which are to continue in common use in all the relations and activities of business life, and which, in the main, form the ground-work for subsequent advancement, they not unfrequently create a thirst for a better and nearer acquaintance with facts and principles, thus acting as a strong mental stimulus, and inducing many to work on after a fair beginning is made, and provide for themselves a liberal education. Let me, for illustration, relate one example. Six years ago, a young man, the son of a not-well-to-do farmer, having received some means by enlistment in the late war, came to our academy and said that he desired only to fit himself for common-school teaching, as he had not much time to spare, and asked what studies he had better pursue. He commenced, of course, at the very rudiments. At the end of the year he left school.

After teaching one term he returned. This same young man to-day is a member of the "Senior class" of Hamilton College, has taken two prizes, and in point of proficiency, if I am not misinformed, stands among the first in his class.

This is one of the many instances which might be given to illustrate the power and influence of academic culture. Colleges drawing all, or nearly all, their material from academies, have a right to

expect young men well prepared to meet the standard of requirements for admission. That the present standard is too high, or too low, we shall not attempt to decide; but whatever it may be, let it be strictly adhered to, let there be no deviation from it, and students will begin to think more about their *preparation* for college than their actual *entrance*.

Academies then will have their own work to do, which they can do, and do thoroughly, if time and opportunity are given.

The preparation of students for advanced classes in college, which some academies practice, can only be done to the neglect of others. Such classes are usually small, oftener numbering two or three than above a half dozen; yet the time necessarily required to do justice, in any degree, to these few, deprives the many of those minute explanations and careful comparisons, the proper avenues for light to a clear understanding of those subjects, which form the basis of the intellectual structure, and which furnish all the means for prosecuting successfully the work of mental development. The pay received from such classes is a mere pittance in comparison with the amount of labor given; and others *must* pay for what they do not receive. It is pleasant for teachers to have students in advanced studies, and their influence upon the school is salutary. But work properly belonging to colleges, and which, in academies, cannot be done without a great waste of time, had better go to its proper place.

Here the question naturally suggests itself, what is the real and legitimate academic sphere? As many answers might be given as there are minds, and doubtless would be, if called for. Cannot a uniform course of academic study be wrought out from this mass of conflicting ideas by a committee of competent teachers, who have experienced the evils of our present system, or rather the lack of any system? Much has been said, many opinions have been given, and some plans proposed, but the solution is far from being reached. To draw a dividing line between the two schools, in any manner satisfactory to either, must be the result of no ordinary forethought and labor; yet the question is of much importance and ought not to be overlooked.

We come now to the consideration of that part of our theme which bears directly upon our common schools. The number and popularity of these schools, and the great mass who are there educated, conclusively demand for them such care and provident oversight as shall render them most effectual for educating the children of our State. Professor Potter, in his work on "The Education of the

People," thus beautifully describes their office: "They should be so conducted as to promote health and vigor of body, and cultivate good manners and refined feelings. They should cherish the moral sentiment and cultivate habits of purity and truth. They should lay the foundation of good intellectual habits, and awaken a spirit of liberal culture. They should extend their benefits to all children not otherwise well instructed." That these conditions, not overdrawn, be fulfilled, the teaching must be in conformity to the best plans of mental, moral and religious development, and by those well versed upon these subjects. That many of our schools are furnished with such teachers is certain, but that all ought to be is equally so. It has long been an important feature in the work of academies to prepare students for successfully meeting the demands from our public schools for able and qualified teachers. That every teacher ought, by thorough and systematic study, and a special course of training, to be fitted for his work, all will concede.

To what institutions can the public reasonably look for furnishing this needed culture? The academies, fairly distributed over our State, nearly every county enjoying the benefits of one or more, and doing their work in the midst of rural districts, would seem the proper means for supplying this great desideratum. For proof that they have long been so regarded, I have only to quote the following from the Regents' Report of 1828: "Such being the present number, state and condition of academies throughout the country, they have become, in the opinion of the Regents, what it has always been desirable they should be, fit seminaries for imparting instruction in the higher branches of English education, and especially for qualifying teachers of common schools." Still later: "The Regents are decidedly of the opinion that the academies are the proper instruments for accomplishing the great object of supplying the common schools with teachers." As early as 1835, teachers' departments were legally organized in eight academies, one in each judicial district, "to promote the education of teachers." The salutary effect of this movement, adding to the teachers' ranks many capable and systematic laborers, soon led to the organizing and maintaining of other similar departments. Thus the good work went on, and April 13, 1855, such enactments were made as essentially adopted the present plan of operation. In 1844, a State Normal School was opened in this city, with the design, as expressed by law, to train and educate teachers for the common schools. To this one seven others have been added—now eight in all. These schools were to be a

prolific source, an inexhaustible fountain, whence would spring such numbers of superior common-school teachers as would make every household rejoice in their good words and works. That they have disappointed the public in the past, furnishes the best ground for belief that they will in the future. I do not wish to impugn our normal schools. I believe them to be thorough institutions. I am well aware that they have exerted a good influence upon the educational interests of the State; that they send forth many excellent teachers, whose hearts are imbued with the sentiment of doing good, and with minds well trained for stimulating and guiding the natural desire for knowledge. But where do we find these teachers? Not in our district schools, as expected, unless it be for a term or so, or until a more lucrative situation can be found elsewhere. The fact is, the pay of such schools is insufficient to procure the services of such a grade of teachers. From $200 to $400 a year is considered ample remuneration. Now, what normal graduate can be induced to work for such wages? I am not at all surprised that we do not find more of them in our common schools, but rather that we find any.

From the last report of the State Superintendent of Public Instruction, we learn that there are 12,038 school districts in the State, which annually employ 28,217 teachers; but the actual number required, when all the schools are in session, is 17,437. This clearly proves that a large proportion of those who engage in teaching do not make it a profession. We learn further, that of the whole number of districts, 11,372 are town districts, and employ 23,196 teachers; of which number 651 were instructed in the teachers' departments in academies, for one-third of the year, and 167 prepared in the State Normal Schools. This gives the normal departments two-and-three-fourths per cent for one year, and the normal schools three-fourths per cent for all past time. Normal graduates, admitting them all to be competent, will occasionally fall far short of what we term skillful instructors. The signal failure of ripe scholars, which often occurs in teaching, lies in the fact that they are incapacitated by nature for such work. The teacher's task is his own; a good education, wholesome rules of action, a familiarity with mental, moral and religious principles, are potent auxiliaries; but *success* lies in that perfect adaptation of the teacher to his work which enables him to observe the workings of mind, and make such demands upon it as will naturally develop its faculties. In view of such facts as we have recited, we come to this conclusion, that every county must, for the most part, educate its own teachers. But where and by whom can

this be done? I answer, in the academies and normal departments of the same, and by the teachers thereof, tried men and women, instructors of experience and of ripe scholarship. A large proportion of these institutions are under the management of distinguished scholars and educators, who are consecrated to their work by and through purer motive than pecuniary gain. Their position is far from being a sinecure. I claim for those preparing for the work of teaching, under *their* tuition, every aid essential to success, notwithstanding our normal schools. The "normal departments," as distributed through the State, reflect great credit upon the judgment and wisdom of the Board of Regents, under whose direction they were instituted. Their ultimate object was to benefit common schools. That they have been instrumental in elevating their standard and character is amply attested by the reports of our school commissioners, and especially by the fact that our best schools are proffered to members of them at rates above the average. I would, therefore, recommend that these normal departments be multiplied, and supported by something of that liberal policy and munificence which have been so freely extended to our normal schools.

The State should put such a department in every academy and union school, and it should be the duty of the school commissioner of the district to make such visitations and examinations as would satisfy him that they are conducted in the best interest of common schools. Let this plan be adopted, and a supply of qualified teachers can be furnished each year. Public sentiment is demanding more system in every department of labor, and I know of no better place to begin than in our schools. Academies, finally, by greater diligence and more faithfulness and thoroughness on the part of teachers, and under the care and guidance of the Regents, who have watched for more than three-fourths of a century their constant growth and labored for their highest welfare, are destined to achieve far better results in the future than they have in the past. I have endeavored to give a summary view of their work, as obtained from observation and experience. Maturer thought will, doubtless, develop that much has been omitted which might properly, and perhaps profitably, have been added. But in view of the increasing interest which attaches to every suggestion of needed improvement in the means or methods of mental culture, we trust errors will be charitably overlooked, when the reflection is reached that we are aiming at reform profitable to science, to ourselves and to those who are to follow us.

SCHOOL APPARATUS.

By Solomon Sias, A. M., M. D.,
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I hold it true that apparatus is needed in the school room for every-day use in illustrating the common as well as the difficult propositions and curious phenomena in science, and I believe it is equally true that our manufacturers are too high in prices for the common articles, although, perhaps, cheap enough for the costlier pieces that require more skillful workmen and longer time to make.

The time has been when geography was taught without globes, maps or pictures. Well do I remember the introduction of atlases into our district school, and with what avidity I studied the one my father got for me; it was a god-send to save the fool's back from many stripes. When Mattison's astronomical charts were published, what a spur they gave to the study of astronomy, and how much better they fixed the ideas of the science in the student's mind. And now we have Johnson's philosophical charts, and I know not how many others. But we want something better than mere charts in teaching the sciences; they may do for the lazy man, but a teacher with a lazy diathesis has no more business in the school room than a blind man has to be an engine driver on our railroads. We want apparatus, not to put in cases to represent the wealth of an institution and make a figure in the yearly catalogue, but to use, use daily, use in the classes. The magnificent planetariums, costly telescopes, large globes, glass plates and lacquered brass may look well at the advent of the annual board of visitors, but they are the mere wax figures of an intellectual museum; they never speak to the student, and the breathing Zouave has no throbbing heart. The pupil that has no atlas with which to study the geography lesson at home, will make poor work with the outline maps on the school room walls, no matter how plain or perfect the maps may be; so the student that only once a term, at the teacher's convenience, sees a grand display of electric or pneumatic experiments in the public lecture, has but a poor understanding of that mysterious agent the storm-cloud awakes in wrath, or of the blue æriel sea whose currents cool the fevered brow.

Let us commence with geography. Although we are greatly advanced in knowledge, and our text-books have been much improved within the past few years, yet we are more theoretical than practical, dealing more in abstract than concrete knowledge. If it is so with teachers, how is it with pupils? Why do we have so few that like the study, appeciate its value, or can pass a respectable examination in it? It seems, even to our adult minds, a mighty thing for the subterraneous fires to lift the lava to the volcano's mountain-crater, and much easier for it to pour out the mass from an opening on the side or in some valley; yet we talk of the relative height of the mountains with the vast dimensions of earth, and can tell the fractional part they bear. Do we realize it? Having occasion one day in a geology class to speak of the crust of earth in connection with the statement that it was about fifty miles in thickness, I asked what fraction that would be of the semi-diameter of earth. The response was immediately made, the $\frac{1}{80}$th part. In order to assist them in grasping the idea of comparative thickness, I asked: "Suppose, with a line $6\frac{2}{3}$ feet long, I should draw a circle on the floor, how thick would the crust be?" Looking down upon the floor, as if to construct an ideal circle, they replied, "one inch." I then asked, "How high would the highest mountains be?" "About the tenth of an inch." "And how high Vesuvius?" "About the fiftieth of an inch." Although their answers had been given with considerable promptness, I was not satisfied they had attained the full idea; I therefore constructed a chart that evening, with the given radius, and hung it in the school room. Judging from the manner in which my advanced students studied the chart the next day, and commented upon it, I am confident they comprehended for the first time the size of earth and the relative height of the mountains.

I do not wish to be fault-finding, an idle dreamer, nor one asking impossibilities; but it does seem to me we need geographical maps and charts, constructed on a uniform scale, to correctly convey the relative size and position of different countries and places. Our present ones are good enough to show their form, but are wholly inadequate to convey any idea of comparative size, doing as much harm in this respect as they do good in localizing places. In some respects we might as well have for school-room use the genuine Chinese maps, which put down that country correctly enough, but dwarf surrounding ones into pigmy provinces or distant islands. I know it is claimed if we had a uniform scale it would turn our atlases into a collection of mammoth posters; but it need not be; let us first

have each of the countries, continents and islands drawn on the same scale, respectable in size; then, if wished, have study and reference maps drawn on any convenient scale, the same as we now have town, county and State maps hanging in our halls and offices. What I seriously protest against is the multiplicity of scales in our atlases and in our wall maps. If Europe is only half as large as North America, do not for the mere sake of uniformity in size of maps, spread it out as large, for the young mind will imbibe the idea of equality in size, rather than notice the increased width of space between the geographical lines.

Again, if possible, give us raised or embossed maps that shall show the leading features of physical development. Drawn on a uniform scale, let the mountains of each country loom up their relative height and the valleys wind among them. In our present knowledge and capability of giving paper a permanent form, it does not seem to be an impossibility, nor that the price need be exorbitant. I have found Gage's embossed map of Palestine far better in giving Sabbath-school children an idea of that now desolated land and the cold winds of Lebanon, than all the descriptions of our travelers and the engravings of our artists. As an illustration of the efficacy of this kind of maps, and perhaps giving an idea for new pieces of apparatus, I would give the following: Finding it difficult one term for my primary class to remember and correctly apply the strange words "promontory," "cape," "bay," "island," etc., I undertook to manufacture a piece of apparatus to show the appearance of each. I cut out the map of North America from a used-up atlas and pasted it on a board. Then carefully cutting through the board, as I followed the shore line of the continent, I succeeded in getting a tolerably good outline of the whole in wood. Placing this in a large square dish and holding it down I poured water in, taking care not to overflow the continent. The result was I had bays, gulfs, capes, and all the divisions of land and water in miniature before them. I spoiled it afterwards in endeavoring to manufacture the Rocky Mountains. Here, however, is an idea that may be useful and practical, and while I file here my caveat with you, I give all the privilege of making this and similar articles, provided you will allow me to tinker out one for myself. We need some such articles for our schools. Raised globes, however, are a ludicrous humbug, like papa's hat and vest on the toddling child. And the grandest humbug of all is putting a small globe inside of a glass sphere painted over with the antiquated constellations of astronomy, and palming it off upon children as giving an

idea of the earth and heavens. I have never yet seen grown or ungrown children that could so far abstract themselves from an outside corporeal existence as to get inside the glass.

In natural philosophy we are more fortunate in the number, variety and usefulness of the articles given us, but at the present prices it would require the gold-producing power of a Midas to thoroughly equip an academy. There is too much looking at show and too little at usefulness in the purchase of apparatus by trustees and founders, and our manufacturers pander too much to the ostentatious pride of the buyer. The new articles added to the manufacturer's list, and heralded to every academy, are not those designed to illustrate common principles, but to show the unsettled discoveries of some fanciful theorist; give to the wealthy scientist the means of repeating the experiments, or to place before the eager, itching eyes of our modern Athenians these new things that are going to upset the universe and give us the spontaneous generation of a higher order. What we need is something to illustrate the common principles, something the school-boy can handle without danger, thus testing the statement of this book and fixing it with the soul's photography on the fadeless tablets of the mind. As we give the pupil a map to use while studying geography, thus letting the eye assist the written word in fixing the position of a river and locating each city and town along its banks, so should we do in philosophy, and its truths would no longer be vague, uncomprehended statements. A few terms ago and the lesson I gave for the morrow included the pendulum; I dreaded it, for with all my labor I had never succeeded in making the majority of a class understand the laws so that they could promptly apply them with anything like correctness. After school, I went into the workshop and made a rude piece of apparatus somewhat similar to the one figured in Steele's Philosophy, and the next day, placing it in the school room, told the class to work out their lessons with it if they wished. It was amusing to watch one after another experimenting with it, but when the time came for recitation there was not one that could not correctly tell the effect of length on the vibrations and the relations existing between the two. Again, plain as it may seem to us here, how many times have we found it difficult for pupils to grasp the idea — for they would remember it if they did — that gravity, light and heat decrease as the *square* of distance increases. The figure in our text-books to illustrate this does all that a mere figure can to show it, but still it seems to the beginner that if the object is removed to twice the distance, it ought to be affected at least half as much. To

illustrate the law, I made with three small pieces of board, a peg and string, the simplest kind of an article, but now they could see it for themselves, and I have experienced no difficulty since in impressing the idea on the youngest mind. So is it with magnetism; you may talk till wearied out, in the plainest kind of words, and in the most familiar manner, about the effect produced, but you can accomplish more in five minutes with a twenty-five cent magnet, bought in a toy-shop, than in an hour's talk; not, however, by using it yourself, but by letting the class play with it. What we need, then, in philosophy is for our ingenious teachers to devise from time to time little articles that will be useful in the school room for illustration, take out their letters patent from the high courts of Jehovah, not those of man, put the contrivance into the hands of some enterprising manufacturer, and let it go forth to bless the world. What we need among our manufacturers is one thinking less of money than usefulness, who is willing to make the articles in a plain, substantial manner, and then furnish them at a price that shall not be more than the Dutchman's one per cent on cost. McAllister has done a good thing toward benefiting our schools, in the production of his "Household Microscope." Although useless to the professional microscopist in his investigations, it possesses all the essentials of the higher priced instruments, and carries as high powers as are available for class illustration. If our schools, instead of purchasing a twenty-five or sixty-dollar instrument to put in the show-case, and seldom, if ever, use, would procure a corresponding number of these, and allow the scholars to use them in the school room, or, perhaps, even take them under certain restrictions to their own rooms, they would do vastly more for the improvement of the mind than they can now accomplish, and lead the pupil to a better acquaintance with the merits and beautiful works of God, with the splendor of those tiny works painted with God's pencil dipped in his own bright tints.

I know, from experience, that it is laborious for the teacher to have class experiments, to have his apparatus ready for use at all times, to perform some experiments to-day and others to-morrow, cleaning and replacing in their cases each day the articles used, and that ofttimes this is rendered yet more laborious by the ill arrangement of apparatus and recitation rooms, sometimes even being placed in different parts of the building; yet I know it can be done, and, if the teacher would do his whole duty to the class, he must endure the toil, for it is this oft-repeated class experimenting that fixes the principles in the student's mind. I know also the great value of the student's experi-

menting by himself, or in the presence of his teacher. It is our students that are to be the future teachers, and how poorly are they prepared to enter an institution as teachers of natural science, having merely witnessed experiments, never having put a hand to an air pump, learned the little technicalities of an electrical machine, or manufactured anything but words of gas. Many a disused or broken article may be traced to the teacher's inexperience rather than inclination. To remedy this and assist in the work of education, give us plain, substantial apparatus, convertible into a variety of uses, with but little danger of breaking or getting out of order, having the screw threads cut with the same die and plate, as far as possible, and place the apparatus itself in the school room so as to be readily accessible. In recitation let the scholars describe some piece and some experiment that can be performed with it. Then produce the article and let some one perform the experiment. If no article is described in the text-book, have a student state the principle as he understands it, not in memorized language—a parrot could do that—then let the teacher produce some piece of apparatus, and with an experiment demonstrate the truth as it is. If the pupil has been mistaken he will never forget the correction.

In astronomy we have but little apparatus worthy of use. I would wholly discard orreries, planetariums, and all of that genus, as they can never truthfully represent the relative size, distance, motions, gravity, light or heat of the bodies. The nearest approximation I have is this: Commencing near one end of the philosophical room, fix little hooks in the ceiling, allowing an inch for a million of miles. Place one thirty-seven inches from the starting point, another five feet nine inches, the next seven feet eight inches, another a trifle over twelve feet, and so on till the room is spanned. From these hooks, by delicate threads, I hang small balls at as nearly the same height from the floor as possible, not, however, exceeding the average eye of the class. To get the position of the planets, not represented in the room, I let the class calculate the distance of each, and then we endeavor to fix it with some surrounding object whose distance I have previously calculated. To form an idea of the actual distance of the earth from the sun, I take a piece of paper one inch wide, mark it off into squares. In the presence of the class I put 100 dots in one of the squares with my pencil, then let them calculate how long the paper ribbon must be to hold enough dots to represent the distance. Having ascertained it, we anchor some well known village to us with our ærial ribbon.

To illustrate astronomy we need some simple piece of movable apparatus to represent the visual angle and the effect distance has on

apparent size; another to show that it makes no difference how large or small a circle may be with which angles are measured; another to show conjunctions, transit and opposition; another to illustrate the cause and effect of the precession of the equinoxes. But while we have teachers ingenious enough to devise these, we have not manufacturers to produce them. Some great lunarian-helioglobulus may be invented, representing in distorted distance, and at any inclined, horizontal or perpendicular angle the motions of a misproportioned sun, moon or water, and out will come flaming notices from the manufacturer, describing its beauties, intricacy and cost. Or, perhaps, some cog-wheeled, rattling ellipticon is devised, to give on a twelve-inch radius an exact representation of the earth in its motion round the sun, accompanied with the changing moon, and enveloped with an elongated revolving tidal wave of tinted glass, while painted tin circles mark the divisions between day and night, and mysterious brass figures point to the shifting hours and flying stars. A few months pass and the manufacturer finds the costly thing a useless waste upon his hands. No wonder he is discouraged, and henceforth kindly declines making anything but the "old stand-bys," following the old patterns. Yet improvements gradually creep in and are adopted by manufacturers and users, despite of failure and prejudices. Wightman did a good thing when he discarded the double-barreled, reciprocating lever air-pump, but Nellegar and Chamberlain did a better when they fixed his flying cylinder and worked it like a pump. Let them go on in the good work, improve and simplify in other cases, devise new articles, reduce the price until their pieces become household property, and make the attachments so that the articles procured from one can be connected with those of the other. Let us assist them in their useful labor, suggest improvements, changes, articles, and perhaps before our time is over we shall see the school room well equipped, and much that is now an abstract idea, half developed in the student's mind, demonstrated with appropriate pieces. As there is no royal road to science, so there should be no monopoly in apparatus. Teachers and manufacturers should work together in harmony. The plea for high prices reminds us of the objections to postal reduction or the cry of the Ephesians at Diana's overthrow, but if a change can be wrought, the quantity of apparatus increased, so that like the stereoscope it becomes a household article, our manufacturers will be benefited, students assisted, the labor of the teacher lessened, the efficiency of our schools increased, and the morning star of our hope give way to the brighter light of an intellectual day.

THE CO-RELATION OF ACADEMIES AND UNIVERSITIES.

By WESLEY C. GINN, A. M.,
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Educators have written much on the comparative decline of collegiate education in this country, and especially in the older States, and the question has frequently been asked, "What has occasioned this decline, and what measures are necessary to turn back the current of public action and lead the thoughts and aspirations of the young more generally to the acquisition of a liberal education?"

Turning away from the great leading causes,—the rapid expansion of our country, its wonderful development of new resources, the inordinate love of gain thus inspired, and the excessive value set upon wealth as the basis of social respectability, may we not find, in the *faults* of our *educational system*, one cause why the public mind so stubbornly refuses to be led steadily forward and to keep pace with the expansion of our population, and of the means for procuring a more liberal culture?

It is necessary, not only, that the people be brought to feel that a thing is good, but, on account of its inestimable worth and present advantage, an irresistible desire or an irrepressible moral conviction must be aroused in their minds that shall urge them on to the attainment of the desired object.

A single consideration, thrown out in a detached form, however it may inspire, for the moment, to activity, is not sufficient to hold the mind steadily in pursuit of knowledge; but all the considerations must be brought to bear upon it, each in its logical order, that it may be kept constantly at its task, and led along by natural steps of advancement to the accomplishment of its purpose.

A single consideration out of place, like a wheel of a system out of gear, may break the connection and prevent the transmission of the force to the proper point of application, and, as a consequence, failure more or less complete must be the result.

May we not, in investigating the relations existing between academies and colleges in our State, find some such fault, destroying the

harmony of the system and preventing the accomplishment of the work for which these institutions were established?

The academy must have its definite field of labor, which the college and the university must not invade; and its pupils must always be looking forward to the next higher grade as a position clearly and definitely above their present stand-point. In the academy, the student must not only be instructed, but he must be held under the personal supervision of some one who is capable of directing his energies, and under whose direction such a state of mental discipline may be acquired as will enable him to meet successfully the responsibilities incumbent upon him as he enters the university. His principal duties there are to learn the mastery of himself, that power of application that will give him present success, and make him victor in the conflicts awaiting him in the future, and the university must not offer him any inducement that will call him away from this preparation before it is complete.

The public high schools, both to the east and west of us, have two well defined courses laid down for their students: a classical course, intended as a preparation for the same course in college, and a general or English course, aiming at a knowledge of the Latin or the modern languages, and of such other studies as will produce in the mind of the student the same amount of discipline, the same power to accomplish, as the classical course is intended to impart.

These high schools say, in effect, "Thus far we will guaranty the preparation of our students, and then we will commit their interests to the fuller opportunities of the college."

Yale and Harvard, the leading universities of New England, and indeed all the other colleges of that section, accept the guaranty and agree to take the student where the high school leaves him, and carry him through to the completion of his university work.

They frame their courses accordingly. The requirements for admission to the classical course in Greek and mathematics are about the same in all the colleges, while in Latin, Harvard's requirements exceed those of Yale by six books of Virgil, three of Cæsar's Commentaries, and three orations of Cicero. Harvard requires that those who present themselves for admission to her Lawrence scientific school shall be graduates, or shall have done the same amount of work as graduates of the classical or English departments of the public high school. Yale, for admission to the Sheffield scientific school, more explicitly requires Davies' Bourdon's Algebra, to general theory of equations; in Geometry, nine books of Davies' Legendre; Plane

Trigonometry, including analytical trigonometry; common English branches, including United States History, and an acquaintance with the Latin language sufficient to read and construe some classical author, and a corresponding knowledge of the Latin grammar.

The University of Michigan, the best known of our western colleges, makes about the same demand as an average New England college, for admission to the classical department. In her scientific course, while falling somewhat below Yale and Harvard in mathematical requirements, and making no demand for languages at present, for 1873 she requires a preparation in French on Fasquelle's French grammar and one-half of Otto's French reader; also, in the sciences — on Botany, through Vegetable Anatomy and Physiology; on Natural Philosophy; on Zoölogy, through Comparative Anatomy and Physiology, and on Dana's Text-book of Geology.

Here we have the demand of the leading eastern and western universities, and in these demands we see an especial attempt to elevate the standard of admission to the scientific, to the same grade of scholarship as is required for the classical course. In other words, these universities are striving to place admission to their *various* departments of study upon the same level of mental discipline, in order that the four years of university study and opportunity shall place every graduate at the same stage of educational advancement. Their object is to enable American students to realize in American universities the same advantages as those which they now seek in continental Europe. And although years must pass before we can hope for a complete realization of this purpose, yet we all hail the effort as a promise of ultimate fulfillment.

Turning to our own State, the empire State in population, in wealth, in commerce and in politics, though she has many old and honorable institutions, which have done excellent service in the cause of general education yet she has hardly one that challenges comparison with old Harvard and Yale; not one, so far as I know, that lays the same demands upon her students, at admission to all departments, as does the University of Michigan.

We have one university of young, vigorous growth and excellent promise, which in four years has attained a national reputation; yet, while bearing the name of university, a name synonymous with severest discipline, the richest culture, the broadest and deepest scholarship, she enters, in a measure, into competition with the academies, offering to admit to her scientific and special courses students prepared only in the common English and in algebra to quadratics.

While the union high schools throughout the State, and a vast majority of the academies, offer in their English courses a preparation for the scientific commensurate with that which they offer for the classical department, yet this university refuses, for the present, this preparation, and receives students to university honors two years before they are prepared to do university duty. I refer to this university, as I did to Harvard and Yale, because to-day it occupies a more prominent position before the country than any other like institution in the State; and because, on account of its princely endowment and the spirit of reform that animates its management, it will undoubtedly be the first, or among the first, to rise to the true proportions of a fully developed university. It cannot too soon break away from a primary instruction, which in no wise belongs to it, and take its proper position at the head of our educational system,—a university in fact, as it is in name. I recognize the generous spirit that laid these broad foundations and opened wide her portals to almost every grade of scholarship, and invited every taste and talent to development amidst her rich and varied resources.

I bow with reverence before that love for young manhood that gathered within its embrace the young men of every grade of society, and said to them, come, I have opened a fountain where all may slake their thirst for knowledge; that went to the farm, into the shop and the factory, and to all the varied pursuits of life, to entice the young to a fuller preparation for their life-work. I bow with reverence and gratitude in the presence of this noble generosity.

I would only have the question settled whether it is well to admit scholars of this grade of scholarship to the classes of the university. That many of them need the opportunities here afforded cannot for a moment be questioned; but should they not be furnished by a different class of schools, the industrial schools, trade schools, polytechnic schools and the like,—the same class of institutions to which such work is assigned abroad?

In such schools, young men and young women, who have no aspiration or purpose for a liberal education, might obtain that training in the useful and mechanic arts essential to success in their several pursuits. Let these schools be called by their right names, and let their certificates of graduation attest simply, in the *name* of the institution which they bear, the kind and amount of work accomplished.

It is unjust to academies that an institution of such rank as a great university should allure, by a low standard of admission, the students

from these preparatory schools, before they have finished their work of preparation.

We all know the tendency of our young people to hurry through the preliminary work of the scholar and get out into the world of business as soon as possible. This tendency we all deplore; and it should be the earnest effort of our lives, as teachers, to check its growth, and by every healthful incitement to inspire in the minds of our pupils an aspiration, kindled into an unflinching purpose, to prepare themselves to meet faithfully the demands of society, to go out inspired with the discipline and clad with the armor that shall make them equal to all the responsibilities to which God, in his love and wisdom, has called them.

We can easily understand how an institution of national reputation, by playing upon this tendency, would let down the standard of education and defeat the object for which universities are established. A spirit of unrest is introduced into the academy, and the boys, allured by the desire of being reckoned among university students, slip from the control and discipline of the academy to take their places as men, without any personal direction, amidst duties, associations and influences for which they are utterly unprepared. Not only are these influences placed before our boys, but the young ladies, having now the same opportunities opened to them, also feel the ambitious desire to shine in the circles of higher literary associations.

Thus the rank of the academy is degraded, its influence and respectability in society is abridged, and the whole educational system is impaired.

A low standard of admission necessarily implies a low grade of graduation. Not that the work is not well done, so far as it goes; but as only four years' work can be done in the four years' course, if a student enters two years too early, he necessarily graduates two years before he is honestly prepared to graduate.

The amount of work required to be done in a university, and the manner in which instruction is there given, principally by lectures, render it necessary that the student shall have acquired, under the personal supervision of a teacher in the smaller classes of the academy, those habits of study and that mental consistency which will enable him to grapple successfully with the severe labor of his new situation.

A large proportion of students, who have only made tolerable advancement in the common English branches and algebra, whose characters both as scholars and men are unformed, must find themselves inadequate to these tasks, and will lose heart and fall out by

the way, and forever give up their long-cherished hope—a hope that might have been realized in the fruition of a glorious manhood, had the foundation been well laid. Mature scholarship can only be reached by regular steps of advancement. Every chasm must be bridged over by hard work. No part of that work can be left undone, and the solid foundation must be felt at every step. You cannot take a scholar out of the primary school and make a university student of him at once.

The kind of work to be done in the university renders a certain preparation necessary. Language is to be learned, and yet the student's only outfit is a very slight acquaintance with his mother tongue. If not a classical student, he should have at least two years in the modern languages or in the Latin. The sciences are to be learned, with all their technicalities. To do this work thoroughly and well, are not some such requirements as those of the University of Michigan for 1873 needed, in order that the student may be prepared to make a proper use of the material given him in the lectures on the various branches of this department of study?

In consequence of the academy and the university occupying common ground, a double set of teachers must be paid to do the same work, necessitating an expenditure without additional satisfactory results. This primary work does not belong to the university, and an economical use of the public money forbids that it should be required to do it. In the great lack of funds for carrying forward the educational enterprises of the State, no public interest requires a more rigid economy or a wiser outlay of money.

It is unfair that new institutions, bearing the same name and rank, should bid against the old and reputable colleges of the State, by offering to admit scholars to any of their departments on a lower basis than that established in the older institutions.

And just here I would plead for a common standard for all institutions of the same name, whether established for the education of males or females. We have collegiate institutes and female colleges, and a multiplicity of other institutions bearing in some way the name of college, which have very little in their instruction or opportunities that entitle them to a name which is intended to give them character in the public estimation above their true merits.

They are scattering their diplomas like the leaves of the forest and just about as indiscriminately. These diplomas bear no higher relation to the parchment of the true university than the leaf of the tree bears to the rich, ripe fruit. Such schools are calculated to delude the

ignorant by bidding for patronage on false pretenses, by crowning their scholars with a wreath that will wither in the first ray of sunlight, instead of the imperishable laurel.

If any men should be honest, they are the educators of the land; if any institutions should be just what they profess to be, they are our institutions of learning, and especially those of higher education. Honesty, square dealing with the public and with each other, should be declared in every act and profession. All sensational advertising should be left with mountebanks, where it belongs, and where it will be seen in its true light. It is undignified, unprofessional. If it seems to become necessary to any institutions, it is only because they do not meet the public demand and call out the necessary patronage, or because there is a surplus of them on the market. If too many, then let them die decently, that others may live vigorously. Let each classification be part of a complete system, each wheel matching perfectly into its fellow, and carrying forward the work to a grand completion.

The academy should not encroach upon the curriculum of the college unless to meet a local want; and the university, which is not local, should not encroach upon the academy, but by every kind of encouragement should strive to build it up, to extend its usefulness and its power, and make it such a preparatory school as the wants of the State demand.

Let this young giant of a university, clad in such matchless resources and glorious possibilities, step boldly to the front, and, no longer dallying with the liliputian work of the academy, assume the grand prerogatives of a national university, with no competitor in the race that shall dare to question his supremacy; and then, with the academies and union schools pressing forward in the work to supply the partially finished material, his strong, skillful hand shall take it up and send forth the polished bolts of thought in the form of cultivated manhood and womanhood, that shall make this the empire State in letters and art, as it is in political greatness and commercial prosperity and renown.

THE NEW DEPARTURE IN EDUCATION.

By Erastus F. Bullard, A. M.,
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With all the wisdom and experience of the past, we do not yet venture to say that we are the wisest men that have lived, that we perform the noblest deeds the world has yet seen. Do we, indeed, wholly avoid the failures of our fathers? How much do we improve upon their successes? Or has the tide of discovery and invention borne us so far in advance of them, that we must fail to see and shun their vices, or to appreciate and practice their virtues?

Were not our intellectual fathers men of faith, men of new ideas, men of progress? And were they to appear among us to-day, should we have to plead excuse for what we have done? Would they upbraid us for our faithlessness; or would they rejoice in our work and recognize in us their rightful successors? Surely no one will contend that no departure has been taken from the course so long pursued by the revered teachers of the past, for it seems marked and decided. But it may be asked why was any departure at all necessary from a system which confessedly produced the ripest scholars, the ablest statesmen, the most distinguished inventors the world has yet seen, from a system which gave to literature its highest excellence and to history its brightest ornaments? Shall we answer that discovery and invention have changed the conditions of life and infinitely increased the wants of man? The railroad does, indeed, reach from sea to sea. The telegraph binds the continents together. But does discovery or invention change the nature and constitution of mind? Do railroads and telegraphs change the laws of intellectual development and growth? Is not the true end of all education eternally the same? Shall we answer that the system of our fathers accomplished its work, that it had its day? But its work is still far from its final accomplishment, and we shall not live to see the full brightness of its day. Shall we say that the spirit of the age demanded it? But true scholarship does not pander to the spirit of the age. It rather leads the age and gives form and tone to its spirit.

No, we will not answer thus. The new system, after all, is not so much a departure from, as a development and growth of the old, in accordance with natural and uniform law. It is the tree with its wide spreading branches of which the old was the promise. The old system contained within itself all the principles essential for its life and growth. They were, by their nature, living and active, and when applied by the methods of the new philosophy they inevitably led to new discovery. Every new discovery supplied a new instrument for use and opened a new field for investigation. The process of discovery continued until our instruments became so multiplied, no single hand could use them all, our fields for investigation so widened, the sun does not cease to shine upon them.

It was once possible to bring within a single course all that was knowable or worth knowing. To this end the original university was constructed. It accomplished its purpose long and well, and became fixed in form and method. Assuming that it had gathered up all that was worth knowing, it proceeded as though there was no more to be known. It was loth to recognize any value in new discoveries. It was hostile to innovation throughout. In vain did the advocates of the new sciences appeal to the old university. In vain did they seek admission within its walls. What remained to be done? The world could not afford to lose the results of science. It had use for them; and they were already recognized as chief agents in the progress and civilization of the present. Should the old be left to itself and new schools be formed wholly on the basis of science? But one would educate for the past and the other might not educate at all, and the two would still continue opposing forces. It seems that no other course remained than to return to the design of the original university. Its plan is enlarged so as to admit all that is worth knowing, both of the past and present. Kindred studies are grouped together, forming well defined courses. They are placed in natural and harmonious relation. The new invigorates and liberalizes the old. The old breathes into the new the spirit of order, refinement and beauty.

It may now be asked, to what end was this union made? In what spirit is the work now progressing? Modern science is, in fact, a new revelation to man. It came almost unsought, and so unexpected that man himself was nearly confounded with the magnitude and importance of the truth revealed. It is a revelation based not on faith nor speculation, but on actual fact. It is wholly material in its means and ends. Its results we see and feel. It has already confer-

red the richest material blessings. It is not wholly strange, then, that it has so nearly supplanted in the minds of some the revelation of the written word. It was only natural that suspicion was awakened as to the value of a system whose chief end is man's intellectual and spiritual excellence. Comparing practical results, it was only natural that an intensely practical age should demand a new system or a reconstruction of the old on a new basis. The spirit and needs of the age forced a compliance with the demand. And as reform naturally tends to extravagance, so the tide of success bore the advocates of the new system to the far extreme. They became more hostile to the old than the old was to the new. The classics and pure mathematics can find no place in their system. These things were good enough for monks and dreaming philosophers of the past; but the present has no need of them. Liberal culture is no longer a worthy end of study. The demand is for practical education, so-called, for successful men, for experts in the paying professions. These demands were so far seconded by the mercenary spirit of the age, that the people have really come to believe that education is no more than a means for gain, that the highest and most desired of all is that which secures the richest pecuniary results.

We submit the questions: to what extent did this spirit prevail in the construction of the new system? to what extent is it now shaping its course? We now notice briefly what seem to be some of the aims and tendencies of the new system.

First it aims to be comprehensive. The new university, faithful to the original idea, seeks to include all that is knowable, to garner within its courses all the treasures of learning. Its range of studies extends from the highest schools of philosophy to mechanics and agriculture. It invites all from the high plains of power and wealth and from the low valleys of human want and weakness to walk together, until they all shall come to share alike the choicest fruits of God's vineyard. It recognizes woman, too, in her rights, her capacities, her destiny, as equal to man; not, however, by the right of wife or sister or citizen, but by her own right, by the right of the better soul, by the sacred right of God's own child.

But does not this comprehensiveness tend to dissipate directness of aim and effort on the part of the student? Does he not often attempt to secure the best of the whole, while the allotted time is not sufficient for thoroughness in a single course? While he would traverse the whole range, the times do not allow him to gather up the fruits of a single field before they press him into service. He snatches

here and there what he deems will serve him best in the immediate activities of life, while he is led to regard with disfavor and contempt those studies which have proved of highest value for thorough discipline and filled the largest place in true culture. And is it denied that there is still a growing tendency to regard the chief office of the university as being rather to train for a profession or a trade than to educate for a life?

We notice, in the second place, that the new system aims to be practical, to fully satisfy all the demands of an intensely practical age.

To be practical should be, and, indeed, is the aim of every true system of education. But it should be no less an aim fully to comprehend and closely adhere to the true meaning of the term, practical. In its true meaning, it is a word of the choicest import. In its right sense, it is making the truest and highest ideal the actual. It is carrying results into the varied relations of life and making them contribute to the success and comfort and happiness of man. The highest practical finds its chief end in man's highest development as an intellectual and spiritual being. But have not modern educators come to use the term in a somewhat different sense? Is this the meaning implied in the popular clamor for "Practical Education?" Does not the term, as applied to education, now rather imply the acquisition of the most knowledge by the shortest process and with the least labor, the substitution of results for regular deductions, of sagacity and cunning for the products of study and effort, the securing of the richest gains by whatever means? And has it not come to be the commonest question of the day, "what practical good is there in such a course of study?"

Now what are the tendencies of this practical aim in the new system of education?

First it seems to lead into error as to what education really is. The people, at least, have, very generally, come to believe that education is nothing more than the mere acquisition of truth, that the main office of the teacher is simply to give, that the mind itself is a sort of receptacle to be filled, and that its highest office is to devise means for gain.

A second tendency seems to lead into error as to the best process of educating. As education is thought to be no more than the mere acquisition of truth, so that process by which the mind acquires the most easily and rapidly is thought to be the most effective and desirable. Hence methods are sought by which the greatest *quantity* can be secured with the greatest ease and in the shortest time. The Lec-

ture Method and the "Objective Method," so called, with other modern methods of instruction, seem to present to the mind what it needs to seek for itself, and largely to substitute the work of the teacher for that of the scholar.

A third tendency of this practical aim seems to lead into error as to the true end and office of education. "What is the practical use of it?" "Does it pay?" are now the commonest questions of the day. These are the questions which the earnest teacher has to answer daily and hourly. And when he can convince the parent that it *does pay*, he has secured his boy for the high school and for the college. The teacher speaks to little or no purpose when he says that the chief end of all true education is found in man himself, that its chief office is to fit him to live as becomes a man, to qualify him to perform well all the duties belonging to a true manhood, to elevate and refine humanity, to enable man to understand his true relation to his fellow-man and to his God, to comprehend, appreciate and gain the true, the beautiful and the good, to enable the mind to follow upward in unwearied search the connecting links which unite the finite to the infinite. No, this will not pay. Such an education will not fit my boy for business, to make money, to speculate in stocks. I wish to give my son a *practical* education. Such is the gross error the people have fallen into, and for it, it seems that the new system, in its intensely practical aim, is mainly responsible.

We notice, in the third place, that the new system aims at economy. In this, it meets the demands of the times. The day has come when man must soon know the ways in which he would walk. The fullness of life urgently calls him out to countless activities. He cannot indulge in the sweets of pleasure or study when duty summons him on every side. If he delay too long in the discipline of his forces, others will enter the contest before him and bear off the palm of victory in his stead. Economy, then, both in money and time, is of so much consequence to the student, that there seems to be a strong tendency to make the education of the present as quick and cheap as possible. The university, by its lecture method, its elective system, and by combining the workshop with the study, brings all that is deemed necessary within the reach of the humblest seeker, and makes it as short and cheap as it can. The Normal School would substitute its course for that of the university, and engages to do a better work at far less expense in money and time. The Commercial College, so called, makes the fairest promise of all, and does, indeed, do the *cheapest* work of all. Economy is, indeed, a worthy aim in every

department of labor. But there is surely no economy so wretched as that which tends to weaken the mind, pervert the judgment, and lead the student to sacrifice true culture in order to save time and money. It is believed that the idea which has become so prevalent, that all necessary education can be secured in a short time and at small expense, is highly adverse to sound scholarship. It is with this view that the advocates of practical education, so called, work mischief continually, in leading young men to substitute their visionary promises for the substantial benefits of the higher courses of instruction.

To educate requires time. It is a slow and gradual process which cannot be hastened. It can proceed no faster than the mind matures. Nature rebels against force, and nowhere does she make a more stubborn resistance than against an artificial or unnatural process of mental development. It is only by many years of fostering care, of systematic training, that the mind can gain the full strength and use of its powers, that the child can be brought to the full stature of manhood.

So we think it a question which we now need consider, whether diversity of pursuits tends so much to success in scholarship as to dissipation of aim and effort, or whether it is possible for the student to secure the highest attainments in scholarship, while he enriches himself by the products of mechanics and agriculture.

It remains for the educators of the present to teach that life is more than a trade, that the things most truly practical in it are those which contribute most to happiness, virtue and truth. They need to teach the world as well as the individual what a true culture is, something of what it costs, the best process of securing it, its chief end and office, and to show by the fruits of their own lives that it *does pay* in the richest possible returns. And when this is fully accomplished, will there, then, be need of still another departure in education?

MODIFICATIONS OF THE ESTABLISHED CURRICULUM REQUISITE AND LEGITIMATE IN COLLEGES FOR YOUNG WOMEN.

BY GEORGE W. SAMSON, D. D.,
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The very statement of the subject here announced takes for granted that Colleges are requisite for young women; that they are to be distinct from those for young men; and that in them special modifications of the established curriculum will be both requisite and legitimate. These postulates demand passing review that the modifications proposed may be rightly appreciated.

The demand for higher and truly collegiate education has been awakened within the last twenty years in our own country and in Europe, just in proportion as the recognition of increased popular representation in government has prevailed. In England simultaneously with increased extension of suffrage the voice of public sentiment called for the establishment of a University Course of Lectures for Women. At Hitchin, a location midway between London and Cambridge, an institution was established at which the professors from both centers met to give courses of lectures. During the past year, the professors at London have resolved to furnish in the city itself a course of lectures for young women; the ladies providing for themselves board, lodging and other means of support. This London movement has determined the professors at Cambridge to remove the institution at Hitchin to a location within two miles of that seat of

NOTE.—In introducing the following paper the writer stated that several considerations had prompted its preparation. A careful study of the progress of collegiate instruction in Europe and America, during the last twenty-five years, had led to the conviction that female education was to receive greater attention than even that now given to our best Colleges. Again, after performing a personal duty to all his sons, now men, at Columbia College, D. C., he had been called to the same responsibility as to his daughters, yet young, at Rutgers Female College, New York city. Yet more, his careful observation as an instructor had revealed the fact that, while the aspiration of female college pupils for high attainments is even more controlling than in young men, scarcely one is to be met who does not rejoice at the wisdom which led the New York State Legislature to restrict Rutgers College from conferring "professional degrees."

learning, so that it can be under their immediate supervision. Turning to Russia, we observe that, only a few years after the emancipation of the serfs, not only elementary schools, but also fully organized Colleges for female education began to be provided. Returning thence westward to Germany and France, the careful observer notes that some of the ablest writers are urging the establishment of collegiate instruction for young women; and are arguing its necessity from the advancement which the common people are making in the control they exert over political affairs.

It is needless to dwell on the fact now so palpable that, in our country, there is a demand not simply on the part of young women, but also of their parents, for a thorough collegiate education as the "right" to which females are unquestionably entitled. The questions incidentally associated with this demand, especially the suggestion that women should receive the right of franchise, add to, if they do not in one sense originate this demand; since the question whether this demand is legitimate must be determined by educated women themselves, in order to be safely and legitimately settled. This association of two ideas is an intimation of two principles, whose relation should be carefully considered.

In the first place, it is a recognition of the fallacy so current, and yet never controlling, that an elementary education is all that is required for the fulfillment of life's mission, both by men and women. Surely this suggestion overlooks the fact, so palpable to every one who thinks the subject through, that the mission of society as a whole requires the higher education which furnishes men of science, art and letters; without whom none of the industrial enterprises of a community could be kept up, and without whom, too, any State would soon be in anarchy. Equally apparent is it that, unless a people are to put themselves in the power of an educated class separate from their families and community and strangers to their sympathies, they must provide this higher education for their own sons. This fact becomes so palpable to thinking men that colleges for young men abound; and parents have sufficient ambition to secure it for their sons. The new and persistent call for female colleges recognizes another principle. The culture of women, and that alone, secures and makes available the culture of men. Search where we will, analyze the social influences that rule in a Turkish or English community, open history at any page, and we find the truth as permanent as human nature, that all efforts to secure true culture among men have succeeded only so far as female culture has prevailed. The

rise of an Aspasia, the inspirer of Socrates, as he himself avowed, is not an exception in human history; it is the rule. All studious observers know that men, associated with women of high position in European society, have been made in childhood or manhood what they are by the moulding power of cultured women. The sojourner in the mansions of families who for generations maintain their ascendancy anywhere in Europe, has learned that the daughters receive as thorough an education as the sons, who graduate from the university. While the idea of higher education is restricted to a class, this will ever remain true. But when the sons and daughters of the people generally claim their title to sit among the princes, when a Russian emperor seeks to have an emancipated people prove worthy of freedom, when in America any young woman may be called to sustain the reputation of a husband occupying official station, parents will aspire to give a higher education to their daughters, and statesmen will appreciate their persistent demand. The neglect which has led to the endowments of hundreds of colleges for young men in our country, while scarcely one man has thought practically of the manifest truth just stated, is one of those wondrous oversights from which men often suddenly awake, wondering that they should have been so long blinded.

The demand for collegiate education we may then regard a legitimate one; and colleges for young women will certainly be furnished by Americans, when Japanese sagacity is discerning their necessity. The question then next arises whether any modification in the curriculum is requisite in such colleges. These two palpable facts meet the comprehensive observer: the peculiar cast of woman's intellect as compared with man's, and her sphere of intellectual influence as separate from his, demand an education parallel to, yet the counterpart of the established college curriculum.

Recent discussion in England as to increased facilities for female culture have led able writers to search the annals of the past, in order to trace the distinction always recognized between the intellectual cast of woman and that of man. From the days of our first mother, the more earnest spirit of inquiry and the quick intuitions have been characteristic of woman's mind as contrasted with man's. Napoleon said, after he had learned to speak frankly, "that in his divorce from Josephine he lost his best counselor; that her instincts were truer than his reasonings; and that her first-glance impressions of men and measures were both more clear and more impartial than those of his cabinet." That man of large success in business is an exception who

has not found his wife's intuitions the happy supplement, the perfect complement of his less impartial estimates and of his more tardy calculations. Yet, again, strength is the general characteristic of intellect in man and grace in woman. The cimeter of the light-horse Saladin cuts hairs in argument when the claymore of Cœur-de-Leon does not break a casque. The ox-like drag of man's heavy-moving mental machinery is outrun by the careering sally and dash that sparkle in woman's debate. No one fails to admit that from the day when our first father yielded to his companion aspiring to be wise, woman has in all history carried her point in differences with man. Assuredly, then, this positive power, so controlling, should be guided by thorough culture.

This leads naturally to the consideration of woman's sphere, as it is now discussed. That sphere, fixed by nature, never has been, and, from the necessity of the case, never can be materially changed. The family is and ever must be the foundation of all human society. If the family be regarded as an association for industrial provision, we are met by the fact that every successful business copartnership has its indoor and outdoor head. If the family be viewed as the school for the wider relation of political association, we know that government must have its appointed official representative. If yet, again, the family be considered in its higher aspect as the divinely established agency for the perpetuation and moulding of a race prepared to accomplish his special purposes, then there can be no question which one of the partners is called to the indoor and which to the outdoor duties of home and country; which to the rough exposure and which to quiet moulding. It is wonderful, now, to remark how comprehensive thinkers have brought harmony into discussions as to woman's sphere, which have at times created an unnatural aspiring, sure to meet disappointment. When Plato, by his Republic, had inaugurated at Athens the same partial philosophy now rife as to female suffrage and official precedence, Aristotle called attention to the *facts* which always have decided and always will decide. The Greeks had always, unlike the Asiatics, maintained monogamy; because there were about the same number of each sex born into the world, and because the Greeks thought every man as an equal, entitled to one companion. The relation of husband and wife he regarded as always subject to voluntary choice; and the position of each in the family that of joint office; woman, because of man's constant public occupation away from his home, being the virtual head of the family, while man's rule was only occasional at home but constant in society at large. As to

political relations, the same profound thinker distinguished between civic right which entitles every individual to protection by law, and political right which gives to the portion of the community fitted for its exercise a voice in making and maintaining government. The latter demands three qualifications: the capacity to decide by practical intercourse with men what should be law; the habit of association with men which gives discriminating judgment as to acts in violation of law; and the physical ability to bear arms in the forcible execution of law. Woman's sphere in the family manifestly unfits her for all these three offices: the legislative, judicial and executive functions of government. All history indicates that woman, by her moral influence, may privately control the counsels of men in their associations for public ends; and that same history equally shows that it is women who are women indeed, filling their positions as heads of families, who most instinctively condemn the few unsexed advocates of female suffrage, who, from personal ambition, misrepresent their sex. All discussions as to the modifications of collegiate education for young women must proceed on the supposition that her sphere of influence is the old established realm fixed by her nature, that of family and social control, which has always most ruled the action of parliaments and of courts, of armies and of nations.

Directing now our attention to our main topic—the ends and means of higher education employed in past and in present times—we find a striking likeness in the practice of civilized nations. Education, as the word implies, is the drawing out, rather than the storing of the mind. It is like the training of the mechanic, of the artist and of the engineer, which develops, directs and energizes natural power. The mind's powers, which require practical drawing out, are those of thought and of expression; the one that truth may be attained, the other that it may be successfully imparted. The fundamental studies employed as means for this development have been in all historic ages, in ancient Egypt and India, in Greece and Rome, and they are now in modern Asiatic and European colleges, these two as primary: mathematics and the classic languages. In mathematical reasoning, the most youthful pupil *knows* whether the process is correct or not; and he can point directly to any error and to its result. The merest child that, by its own effort, seeks the sentiment of another's mind through a foreign language, and is daily called in translation to express that thought readily in his own tongue, is employing a means of culturing both thought and expression for which human wisdom has never been able to devise a substitute. The discussions in Eng-

land during Arnold's day, in Russia within the past year, and of our American educators during recent changes in collegiate instruction, have confirmed the philosophic conclusion that the study of the cultured classic tongues, from which all the languages of Europe have derived their terms of science, of art and of philosophy, are absolutely essential in three respects to true mental development: first, as the structural foundation of all modern cultured tongues; second, as the storehouse of scientific nomenclature; third, and mainly, as a developer of the power of thought and of expression, which can receive no substitute. Young women must either remain wanting in the very elements of mental development, or these first lessons in intellectual gymnasia, the mathematics and the classic tongues, must be fundamental in female colleges.

In all ages, however, the mere gymnasium or provision for simple development of the mind's powers has been made but the preparation for university studies, which are to store the mind; and these have been pursued with more or less of completeness in our colleges as time and facilities have allowed. These may, perhaps, in higher departments of collegiate education, be grouped under these seven schools: mechanics and natural philosophy, embracing applications of the mathematics; natural history, including plant, animal and human anatomy and physiology, with geology; language and literature, embracing all those studies designed to give practical skill in the use of foreign tongues; rhetoric and logic, which afford power in the use of one's native language; æsthetics and criticism, embracing practical as well as theoretical acquaintance with the fine arts; civil history, political science, and economics; and moral and intellectual philosophy. In each of these departments of collegiate study, not only the demands of general culture, but the practical demands of her sphere, require that a young woman become proficient.

Young men devoted to any pursuit, industrial or intellectual, are trained in mechanics, astronomy and natural philosophy as an essential part of general culture. To young women the principles of mechanical laws will be directly practical in the varied oversight of the household, which are always either directly or indirectly woman's care. Very few young men are called to any practical application of their knowledge of anatomy, physiology and hygiene; but every physician, knowing that sickness and its cure are to be met in all households, and are always woman's responsible charge, feels that his prescriptions will be sure of efficiency only where an intelligent nurse presides. A man of collegiate training, engrossed in profes-

sional pursuits, feels no hesitation in avowing at home and abroad that he has no time to keep up with the current literature of the day, or to acquire facility in the use of a foreign language; but his companion, educated or not in the school, would be mortified to make a similar avowal. Young men, who design to devote themselves to business rather than professional life, are urged in college to train themselves to proficiency in logic, rhetoric and elocution, since not only in public but in private circles this acquisition is absolutely essential to meet with ease and grace the tax of cultured association; and in this the women of our day are and must be leaders. For, in all history, theory might anticipate, and experience confirms as the fact, that a literary atmosphere never pervades society, unless women of culture compel the conversation of the social circle where men and women meet, into a common channel, as they cannot in conversation as to the business pursuits that occupy them; and even here elocutionary training is found indispensable to facility, grace and attractiveness in literary conversation. In the fine arts, especially in music and drawing, practically if not theoretically, it is the exception when the educated man is proficient; but with young women the exception in such attainment is always marked as a defect in natural gifts or in early training. In the practical application of the lessons of history, in the philosophy that underlies especially politics and economics, woman is more practically interested than man; for if man gathers wealth she controls its expenditure; if business-men seek fragments of time for consideration of the means which keep up the physical and moral health of the body-politic, woman is expected to share most largely in correcting the evils which unwise legislation and violations of law entail. Yet, again, who knows not that it is the wife, the sister, whose intellectual and moral influence is expected to give law to men trained even in the college; and how is this possible unless man's knowledge in these departments be woman's also? In each department of collegiate instruction, if women be considered merely as the companions of men, woman's need is if anything greater than man's; and the college should be as much for the one as for the other.

But how enhanced this demand when we consider that woman's culture is to give shape to succeeding generations. While the wife and sister by their culture give character to the social circle and thus to the real spirit of a nation and an age, it is pre-eminently the mother's culture, not the father's, that gives the first spring, the early shape, the mature moulding to the intellectual and moral cast

of the age next succeeding, and thus to generations still to arise. The impressive fact that while under European institutions, religious, political and educational, families are built up which for generations maintain an elevated position and a superior culture, scarcely a single American family has survived the decline of the second generation, is beginning to awaken the attention of men who seek for themselves, their family and their country something more than an ephemeral fame. Children of our great and princely men drag down to oblivion the worthiest name, because the generation that next wears it shows a lack of fidelity most vital in the educational training of heirs who should prove worthy of their parents. Where are our princely families in the land, whose princes in wealth and wisdom of the first generation, nevertheless, so greatly abound? Which of our noble statesmen, generals, merchants has left descendants that gave increased luster to his name? So rare is the exception to the fact that the very children trained in the household of the noblest specimens of American manhood disgrace the parents who should have made them worthy—so rare is the exception, that the causes of this anomaly begin to awaken earnest inquiry. It is worthy an hour's thought; but to one, mainly, of these two causes it must be referred: either the father has too much to do to gain and to maintain his own high position, and therefore neglects the training of his children, or the mother lacks that practical wisdom which thorough collegiate training affords. This latter, as history attests, is the main error. The mere material, superficial, artificial show of her family absorbs the thought and labor of its head; which, if directed by the counsels and control of an educated mind, would make her children derive from their increased facilities an advance on their parents and their generation at large that would secure perpetuated families of growing power in every department of life.

This double demand, then, for higher female education, the controlling influence it will certainly have on the existing age and its forming and growing power over the next, calls back our thought to the leading point of our proposed consideration: *The Modifications of the established Curriculum requisite and legitimate in Female Colleges.* Our previous survey of the cast of woman's mind as the complement of man's, of her sphere as the supplement of his, and of the direct tendency of the college curriculum to develop and direct the mental energies of a young woman as well as of a young man, while at the same time they are more generally practical in woman's

than in man's lifelong vocation, restricts this final survey to a narrow limit.

Every one of the seven departments of university, as distinct from gymnasia studies, is as important in female as in male education. Within the last few years the increasing importance of special training for lucrative industrial pursuits has called for modifications of the curriculum to meet the wants of our young men destined to different professions. A careful discrimination, directed to the special vocation of woman as distinct from man's, fixed as this her vocation is by her peculiar cast of mind, may suggest modifications perhaps even more legitimate than those made for different classes of young men.

To woman, grace, rather than strength, is the natural divine gift; she is to rule by gentle yet effectual persuasion, rather than by stern close-linked and hard-pressed conviction; and her domain is more purely æsthetic and moral than it is logical and intellectual. This calls for another glance at the several departments of collegiate study, to see in what schools woman's culture must be more extended and in what it may be less labored, than in colleges for young men.

Commencing with the classic languages, it is manifest that young women must make greater attainments in modern languages than young men; especially in French as the language of common intercourse, in German as the language of literary research, and in the Italian as the language of art. This demands a more restricted study of the classic tongues. Here our attention is called to the fact that in former times special selections were made from classic authors, as Cæsar, Virgil and Cicero, required for entrance into college; while now whole books of these authors are to be passed in review. Practical teachers now find, that, for a few weeks, a new author will be carefully studied until his peculiar style is mastered; when the rest of the entire volume is carelessly run through, either from the attraction of the narrative, or as a drudgery that must be undergone. Much of the time thus devoted to classic authors, many thoughtful teachers cannot but regard a waste; while some will come to the forced conclusion that, by cultivating habits of careless study, this undigested storing is worse than useless for all purposes of genuine culture. The female college may certainly take the position that the thorough mastery of the general structure of the Latin and Greek tongues attained in the grammar of these languages, a practical power to employ their etymology and syntax by the drilling of prose composition, and a familiarity with the vocabulary and idioms of the

best historical, poetical and philosophical writers attained in choice selections from a few works, as a modification of the curriculum of classic study, may give time for added lessons in modern languages, while attended with no real loss of true culture in the classic tongues.

Turning, again, to the second department of gymnasia studies, the mathematics, these two facts are to be observed. The end of this study is twofold; to train the mind to detect errors in the process of thought, and to give an understanding of the principles of mechanism framed by man and established by the Maker of all in the material universe. These ends are indispensable in female mental development. But the practical teacher has learned that full one-half of the labored demonstrations of propositions in geometry, two-thirds of the problems in algebra, and like proportions of the treatises on trigonometry, algebraic geometry, and calculus are repetitions both in principle and detail; and that they occasion, as do repetitions in classic readings, either a listless or a careless habit of study; securing, indeed, facility from review to practical mathematicians, but giving no new employment to the mental powers, and furnishing no new principle for future use in terrestrial and celestial mechanics. The same reduction may here be made in the mathematical as in the classical curriculum; and this may afford the time requisite for æsthetic and art-studies, specially demanded in female as distinct from male collegiate education. The naturalness and hence the legitimacy of these suggestions will appear on a moment's reflection. As the study of the ancient languages is directly subsidiary to that of the modern languages, whose words, if not their idioms, are so largely derived from the former, so the study of the mathematics, as the ancient Greeks had learned, have a bearing on the fine arts quite as important as on the mechanic arts.

It is needless to dwell on the minor modifications that the good sense and observation of every educator will suggest as appropriate for female culture in the other departments of college study. As already intimated, the amount of time given to modern languages in female colleges must be greater than in colleges for young men. It follows necessarily from this fact, also, that a different method of instruction must be pursued, since the end to be attained is practical facility in speaking at least French and German; which cannot be secured without direct use of these languages in certain parts of collegiate instruction, or by the employment of them in certain hours devoted to college pursuits. It will be naturally suggested, too, that instruction in elocution has a different end and must take a different character

from that given to it in young men's training. It is not, however, for that reason to be neglected; since the elocutionary training of the college is deemed essential even for those who do not intend to be public speakers; who need, however, to acquire confidence, ease and grace in communicating their thoughts in private and social circles. As this is pre-eminently woman's sphere of intellectual and moral influence, while none of the special styles of elocution, as the dramatic for the stage, the oratorical for the platform, or the didactic for the desk are demanded, that other general style properly called the conversational, which can take on, upon occasion and for the moment, either of the features of the three special styles, that which gives special vivacity and effectiveness to every popular speaker in public or private,—this is to be a part of an educated young woman's training.

In closing this cursory survey, it must be apparent that the special form which is to be given to female colleges, now becoming a reality in the State of New York, demands the attention of our very ablest men devoted to the subject of the education; not simply of those who are giving their energies directly to it. It is certain that colleges specially devoted to female education must be furnished for young women. If trustees are brought to think it proper that existing colleges be opened for young women, those who most long for such education will not overcome that delicacy of sensibility which forbids their entrance. Yet more, if admitted, and if accepting the proffer, the curriculum specially prepared for young men will prove quite unadapted to the intellectual development of true women.

ETHICAL ASPECTS OF SCIENCE.

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The intense energy which has characterized the prosecution of research in every department of science, during the last fifty years, has borne legitimate fruit in the numberless theories advanced touching the genesis of man and of the world. Organic chemistry and the microscope have opened up the arcana of the physical world, and revealed marvels beside which the wildest dreams of the Persian magi were mere commonplace credibilities. Physiology has made such strides that, in its latest phase, it may be regarded as a new science, while all the kindred branches, which a lack of suitable instruments of research had previously cramped, having overleaped their boundaries, are now running their race with incredible swiftness. The ferment of industry profoundly agitates every science. *Opere omnis semita fervet.* That man, with his irresistible tendency to theorize, should turn those new floods of light on the problems of his own destiny and that of the world he inhabits, is not to be wondered at; but it is a wonder, and a matter of regret likewise, that in too many instances he has wrested the grand truths of science to his own degradation and sadly perverted their significance. He has done this by inventing theories at variance with those principles of morality which have governed the world for ages, and on the integrity of which the welfare, nay even the existence of society depends. To assert that legitimate science is to be held answerable for the excesses of her votaries, would be as false as presumptuous; and while I may have occasion to find fault even with men who have won for themselves undying fame by their discoveries, I am convinced that I do greater honor to their names while endeavoring to remove those spots which dim the luster of their greatness. Theories adverse to morality spring from the tone and direction of modern scientific research, or, to formulate it more precisely, from the misapplication of the scientific mode of investigation to the sciences themselves and its application to subjects to which it is not adapted. If scientific men started with the postulates that there is an essential difference

between right and wrong, that conscience is the immediate discerner of the difference, and that this perception is intimately connected with a system of rewards and punishments, they would hesitate to draw conclusions in conflict with those postulates, even when apparently justified by the premises. But deeming all admissions not resting upon a scientific basis as calculated to restrain inquiry, they strive, by the elimination of all *a priori* truths, to make the mind a *tabula rasa*, and to build up a system of knowledge which must invariably respond to the test of experience. I had the honor, two years ago, to call the attention of this learned assemblage to this tendency of the scientific mind in its dealings with physiology, and noted the case of an eminent teacher of medicine in France, who asserted that the admission of any principle of action in man, which could not be brought to the test of chemical and physico-chemical modes of investigation, should not be allowed in advance, as calculated to narrow the field of physiological inquiry. But it is not in physiology alone that this repudiative tendency exists, since it is still more openly displayed in those studies which have for their aim the co-ordination of all the sciences. Comte, Spencer and Mill may be taken as the leading exponents of this effort at co-ordination, and the relations their labors bear to the universally accepted principles of ethics may be regarded as partially illustrating my theme. John Stuart Mill accepts the positive philosophy of Comte, in so far as he accepts the principle of evolution and transition of the sciences, from the theological to the metaphysical state and from the metaphysical to the positive; while Herbert Spencer adheres to the same principle, with trifling variations. Now, if we admit this principle in its entirety—and those gentlemen need not be reminded that in order to be logical they must do so—we bring under it not alone the so-called exact sciences, nor purely intellectual truths, but all objects of knowledge of every description, thereby striking a fatal blow at those principles of order and morality upon which human society was originally founded and upon which it virtually rests to-day. The theological relation of the mind to knowledge was founded, they say, in the belief that a direct intervention of personal volition governs all phenomena in the moral as in the physical world. But as the constancy of those phenomena became apparent and experience taught the variability of volition, virtues and entities were imagined to reside in those invariable antecedents of phenomena, sometimes denominated causes. If this first step in the stage of the theory of evolution be admitted, what becomes of those truths which are so

intimately connected with their grounds of admission, that the latter being called in question, the truths themselves must cease to exist, at least for us, subjectively? The phenomena of the physical world remain truths for us always, no matter to what agency we attribute their production; but the moment we question the source of our moral sentiments, whether we doubt them to be the product of fear and prejudice, or, as D'Israeli says in Lothair, "if we question that thought is phosphorus, soul complex nerves, and our moral sense a secretion of sugar, from that moment those sentiments become imperative, and every check to human passion is removed." Now, admitting the principle that all human knowledge reposed, in the first instance, on what those philosophers call a theological basis, and for the purpose we must include all moral and religious beliefs, the moment that basis is found insecure does not the whole superstructure topple? The phenomena of the outer world, having nothing to do with our moral conduct, stand in the same relation to us as before; but men must have ceased to believe that there is an essential difference between right and wrong, that obedience to lawful rulers is a virtue; in a word, during the period of transition to the metaphysical state, the moral world must have been all agog. Happily, history presents no such fearful picture to the view, and so far the transition theory and history do not harmonize.

Pursuing the revolutionary doctrine, we find the next transition to be from the metaphysical to the positive stage. And here is wrought a new subversion of our motives of certainty. Supposing that mankind had recovered from the bewildering discovery that all it had hitherto believed was the baseless fabric of a vision, and that it must set about reconstructing science on a new foundation; no sooner is the new structure complete than it must be again pulled down, and this time the fair edifice reared by Plato, Aristotle and the schoolmen of the middle ages must succumb to the free spirit of transition, or, as the philosophers of the new school would say, the metaphysical stage of human knowledge must give way to the positive. To-day we are in throes of this transition, and doubt must triumph till the high priests of the religion of humanity have completed their work. This revolution is in reality going on in the scientific world, and positivism is the legitimate offspring of modern science. Science says that, in the prosecution of its ends, nothing can be admitted but what experience demonstrates. Practically, it confines the effects of this dictum to its own domain; but positivism, with a more logical grasp of the principle involved, applies it to all things knowable, and hence

the new science of sociology. Society and morals must be reconstructed, new relations between capital and labor must be established, a different basis for the distribution of property be employed; in a word, the face of the earth must be renewed. Does not every one perceive that the direct consequences of this doctrine would be the overthrow of those principles which have hitherto guided man in his efforts to consolidate the interests of society? Not only must Christianity, which mainly represents what is, by the positivist school styled the metaphysical stage of human thought, be cast aside as having ended its mission in the process of scientific evolution, but even the moral doctrines, which natural theology inculcates, must cease to influence men's conduct, having lost weight by the removal of the ground-work on which they had hitherto rested. If positivism has been of slow growth in the natural sciences, how much slower must be the progress of the complex process of positive reconstruction in society and politics? In the mean time, having rejected the moral code which belonged to the theological and metaphysical periods of thought, how are men to govern their lives, to what standard or rule of action must they conform their conduct? If conscience and the hitherto regarded immutable principles of action upon which conscience proceeds are robbed of their coercive force, who or what influence can stay the hand of the secret assassin or the torch of the midnight incendiary, or who knows at what moment mob law may reign supreme in the land, light up the skies with the lurid glare of burning cities? Penal laws have long since proved inadequate to the prevention of such enormities, when the public conscience has been profoundly disturbed. It is surely, then, a subject of congratulation that these views are not of wider prevalence. And yet the rapid popularization of science and scientific theories through the medium of an ever-growing press, and their presentment rendered each day more attractive by the artifices of rhetoric, cannot but rapidly impress the minds of the masses. We are all aware that the reconstruction of society in accordance with the principles of the new school of sociology was attempted in Paris not long ago, and the results are not unknown. Were I to speak of the later speculations of Comte, which Mill and Comte's most ardent disciple hitherto repudiate, I should give offense to cultivated minds. And yet, notwithstanding the absurdities which characterized those later views of Comte, they are more logical than the conservatism which makes Mill and Spencer halt midway, for they are the natural consequences of the classification of the sciences admitted by them all. If we here

pause to consider the immediate cause which led science to favor this plunge into the seas of universal uncertainty, we shall find it intimately connected with a gross misapprehension of the word *right*. With strange inconsistency, Comte himself pointed out this mistake. Scientific research necessarily presupposes as a condition of success entire exemption from restraint, the greatest freedom of investigation. But this freedom is an evidence of progress only when not exercised inconsistently with pre-established truth, and as each series of scientific truths becomes unfolded, the limits of this freedom must be proportionately narrowed. We have a legal right, indeed, to pursue our inquiries to the verge of folly, but not a moral right to do so. In this sense, there can be no such thing as a right of freedom of conscience or to free-thought; for the moment a fact, of whatsoever sort, is established on an incontrovertible basis, from that moment no one has a right to call it in question. The mistake consisted, therefore, in confounding an exemption from legal restraint in our investigations in religion, morals and science, which all claim as an inalienable prerogative, with the logical right to call in question recognized and long-established truths. If our savans had but kept this distinction in sight, they would not have blundered into the absurd formulary that all men have a right to think for themselves, for surely a mere exemption from legal restraint does not constitute a right.

Were I to enumerate the many theories based upon the data of modern science, all looking to the solution of cosmic and human genesis, and all equally amenable to the charge of subverting the universally accepted ethical doctrines, I should pass the limits of the prescribed time. But the very fanciful manner in which Saigey in France conducted his system to conclusions of rank materialism, cannot but prove interesting and significant. This gentleman, starting with the assumption that unity is the basis upon which the universe was planned, imagines motion to have been the first cause, inasmuch as he assigns no ulterior cause for motion itself, and refers all phenomena to this agent. Everything is motion transformed—light, heat and electricity. Inert matter there is none. Spiritual substance there is none. These admissions would prove fatal to the fundamental idea of unity. Thus, for the sake of an idea, this savan confounds mind with matter, forcibly conforms his theory to his idea, and views the facts and phenomena of nature in a most grotesque light, in order that they may be made adaptable to his theory. The idea of unity is undoubtedly sublime, but not such a unity as distorts truth. The older

philosophers had a grander idea of unity than this when they admitted one God in whom all things are contained as one, in what they termed an eminent manner, that is, a manner ineffably superior to what human tongue can express or human mind conceive; just as, in the political world, the unity implied in a universal submission to one God is immeasurably grander than the idea of mere geographical unity, which so often involves injustice to those on whom it is made to operate. And when a principle so grand in itself is thus misunderstood and misapplied, there is no limit to the errors which may result. Thus, the moment Emile Saigey formulized his theory into the dictum, "atoms and motion form the universe, with motion as prime cause," from that moment he began to relapse into the ridiculous notions of Epicurus Leucippus and Democritus. In order to explain the admirable order of the universe, he had to admit an inherent virtue in those atoms, by which, being once set in motion, they selected such relative situations as gave rise to this harmonious arrangement.

But to hasten to a conclusion. The radical error underlying those false speculations is one of method. The scientific method is that of induction or analysis; it proceeds from the particular to the general, and can employ synthesis only when the enumeration of similar facts is complete. Any attempt at synthesis, before a perfect enumeration of any set of similar phenomena is made, leaves the door open to possible error, and so long erroneous speculations will be rife. Strict logic demands this condition for the valid application of the synthetical method. It is not meant, however, that this enumeration should be metaphysically complete; for, as in the deduction of the law of universal gravitation, Newton could not have observed all instances to which the law applied, but a reasonable analogy, relatively to him invariable, constant and universal, justified his conclusion. If scientific men were but to refrain from synthesis till a similar analogy came to their aid, the cause of true science would be greatly served; for the energies which are now expended in pernicious speculation would be directed towards discovery, and would help to increase the store of facts till their number would admit of their being enumerated under a general law, and thus justify the use of the synthetic method in their regard. But not only should the true method of investigation proper to the sciences be faithfully exercised, but the youth of our colleges should be taught that there is another mode of investigation, eminently logical, and suited to problems of the social and moral order. The exact sciences rightly

admit no *â priori* truths of their own order, for they deal entirely with experience; but no one can undertake the rectification of our social or moral system without the *â priori* knowledge of God, the first cause of all things. If we call the knowledge intuitive, the mode of inquiry is simplified, but herein, at all events, lies the essential difference between the methods of investigating physical nature and dealing with the social and moral problems of life. The former method, rightly pursued, leads to a clearer conception of the power and goodness of the Deity; the latter method must have its starting point in the idea of the Godhead. For this reason, the Aristotelian or syllogistic mode of proceeding admirably answers the purposes of this second method, since the syllogism, in every instance, proceeds from the better known to the less known, and knowing God we know all things in him, but as "through a glass darkly," whereas the inductive method takes facts as it finds them and thereon builds general laws.

Since it would be presumptuous in me to hope that ideas so much more eloquently presented by very many others should carry with them much weight in this crude shape, I will state that I have merely desired, through a sense of duty, to lift my feeble voice, in behalf of what appears to me the truth, before a learned and appreciative gathering.

STATE AID TO ACADEMIC INSTITUTIONS.

REPORT OF THE COMMITTEE APPOINTED BY THE UNIVERSITY CONVOCATION ON THE INCREASE OF THE LITERATURE FUND.

At the last annual meeting of this Convocation the following resolution was adopted:

Resolved, That a committee of ten be appointed to secure, by legislative action, the increase of the literature fund, the proceeds of which are distributed to the academies of the State.

Under this resolution, the Chancellor appointed the following individuals as the committee:

J. Allen, Principal of Alfred University, Academic Department.
J. E. King, Principal of Fort Edward Collegiate Institute.
Albert Wells, Principal of Peekskill Academy.
J. S. Gardner, Principal of Whitestown Seminary.
G. B. Manley, Principal of Cortland Academy.
A. B. Watkins, Principal of Hungerford Collegiate Institute.
N. T. Clarke, Principal of Canandaigua Academy.
S. D. Barr, Principal of Penn Yan Academy.
J. Jones, Principal of Geneseo Academy.
G. W. Briggs, Principal of Delaware Literary Institute.

This committee held a meeting at Syracuse, on the 5th of December, 1871, and after full consideration of the subject the following resolution was adopted:

Resolved, That simple justice requires that the annual distribution to our academic institutions be increased by the State to $200,000.

To secure this end, the following petition to the Legislature was adopted and sent to the trustees and principals of academies and academical departments of union schools:

To the Legislature of the State of New York:

The undersigned, inhabitants of ———, in the county of ———, and trustees of ———, respectfully represent:

That in the year 1838, in an act passed "to appropriate the income of the United States deposit fund to the purposes of education," etc., it was provided that, from the income of the said fund, $28,000 should be annually paid over to the literature fund, to be distributed, together with $12,000 from this fund, among the academies of the State. By

the same act, appropriations were made to the common school fund; thus providing, at the same time and from the same source, for the academies and common schools.

The number and condition of the academies at that time, and at the present, are indicated as follows:

	1838.	1870.
Number of academies	103	200
Scholars in attendance	10,111	30,313
Invested in lots and buildings	$772,270	$3,435,556
Tuition received	102,155	387,283

Notwithstanding this large increase in the number of academies, the attendance and the sums invested by voluntary private contributions, and the payment of tuition, the literature fund has not been increased since that time.

It has always been the policy of the State to encourage such contributions for educational purposes. Now, that these have largely increased, the same policy requires increased encouragement.

The work which these institutions do, gives them a fair claim to an increase of appropriations. The academies and academical departments of union schools furnish higher education to large numbers from the rural districts, which their common schools cannot, in the nature of things, provide. A large portion of the teachers of the district schools are educated in them. The normal schools receive $18,000 per annum each, while no academy receives over $200 for educating teachers.

These institutions cannot be maintained in a condition of efficiency, without additional public aid. This, your memorialists believe they deserve, and that every consideration of public policy demands a more liberal provision for their support. They, therefore, respectfully and earnestly ask your honorable body to give the subject due consideration, and to appropriate such an additional sum as your wisdom may dictate.

A sub-committee of five, consisting of Messrs. Allen, King, Barr, Jones and Watkins, was appointed to personally present the subject to the Legislature. This committee, through a portion of its members, assisted by the Secretaries of the Regents, appeared before the educational committees of the Legislature and laid before them the claims of academic institutions. The attention of various other members of the Legislature was called to the subject. A clause was introduced into the appropriation bill and passed, as follows:

"For the benefit of academies and academical departments of the union schools, the sum of one hundred and twenty-five thousand dollars, or so much thereof as may be derived from a tax of one-sixteenth of one mill upon each dollar of the taxable property of the State; the sum thus arising to be divided as the literature fund is now divided, which is hereby ordered to be levied for each and every year."

The following supplemental act was introduced and passed the senate, and was ordered to a third reading in the assembly, which it did not receive before the final adjournment:

An Act in relation to academies and union schools, and the distribution of public funds.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. The Regents of the University are hereby authorized and directed to distribute the sum total of the several appropriations to academies and union schools provided by law to be made, in the manner following, that is to say:

1. Such sum, not exceeding six thousand dollars, as may be applied to the purchase of books and apparatus in the manner and on the conditions now prescribed by law.

2. For the instruction of teachers of common schools, in a course to be prescribed by the Regents of the University, in such academies and union schools as the said Regents shall designate, a sum not exceeding forty-thousand dollars in any one year, at the rate of fifteen dollars for each scholar so instructed during a term of thirteen weeks, and at the same rate for not less than ten weeks nor more than twenty weeks; but no institution shall receive more than five hundred dollars on account of instruction so given during any one school year.

3. All scholars in any academy, union school or common school who shall hereafter pass the preliminary academic examination instituted by the said Regents, shall be entitled to receive instruction in the classics or higher branches of English education, or both, in any academy or union school subject to the visitation of the Regents, for a period not exceeding twenty-six weeks; and institutions giving such instruction shall be entitled to receive twenty dollars for said twenty-six weeks' instruction, and at that rate for a less time.

§ 2. The balance of the sum total of the appropriations referred to in the first clause of the first section of this act, remaining after the appropriations provided for in the subsequent clauses of the same section, shall be distributed *pro rata*, as the income of the literature fund is now distributed pursuant to law.

§ 3. The total value of the property of every academy hereafter incorporated by the Regents of the University in lot, buildings, library and apparatus, shall be at least six thousand dollars.

§ 4. The treasurer shall pay annually, on the warrant of the Comptroller, the several sums to which the Regents of the University shall certify that each institution is entitled under the provisions of this act.

§ 5. The Regents of the University are hereby authorized to make such just and equitable rules and regulations as they may deem necessary for the purposes of this act.

§ 6. This act shall take effect immediately.

The object of this supplemental act was to bring the academies and common schools into more intimate and helpful relations, and to begin the application of the free school system to the higher institutions.

Permit us to present some considerations why the measure thus inaugurated should be perfected and perpetuated.

I. ITS JUSTICE.

The committee predicated its appeal to the Legislature, primarily, upon the simple justice of the measure. This was enforced by the following considerations:

1. What the State is doing for its common schools. In 1869–70 it paid by tax, exclusive of New York and Brooklyn, at the rate of five dollars and ninety-five cents per pupil, and for the whole State, six dollars and thirty-three cents. The total expenditure, exclusive of repairs, was at the rate of fourteen dollars and sixty-nine cents per pupil. The general tax pays forty per cent of this, while local tax pays the remainder.

2. What the State is doing for its normal schools. To six normal schools it paid in 1869–70 the sum of $122,728.59 toward the education of 1,054 candidates for the profession of teaching, being at the rate of $122.12 per scholar; or, if we add the academic students, 332, it amounted to ninety-two dollars and eighty-eight cents for each normal and academic student; or, if we include as pupils children of all ages and grades, it gives an average to each pupil of forty-one dollars and ninety-five cents as State aid, only thirty-four per cent of those aided being normal pupils proper.

3. What the State has been doing for its academic institutions. In 1838, it paid the sum of $40,000 toward the education of 10,111 scholars, equal to three dollars and ninety-six cents per scholar. In 1870, it paid the same sum of $40,000 toward the education of 30,313 scholars, being at the rate of one dollar and thirty-two cents per scholar. The average ratio for ten years previous was one dollar and thirteen cents. If we add the $14,636 paid academies in 1870 for the education of common school teachers, it amounts to one dollar and fifty-four cents per scholar, as against forty-one dollars and ninety-five cents which the State pays the normal schools for teaching, on an average, a much lower grade of pupils, and against five dollars and ninety-five cents which it costs the State for each pupil instructed in the common schools, or, including all expenses, against fourteen dollars and sixty-nine cents which it costs the people for each child so instructed. It costs the academies, including all outlays, on an

average, fifty-four dollars and eight cents yearly for each scholar instructed. Of this amount the State pays only a little more than three per cent. For every teacher instructed by the academies there is a loss of twenty-four dollars, the State paying thus fifty-five per cent of the cost and compelling the academies to give the remainder.

4. If the State paid the same per scholar for those taught in the academic institutions as it does for those in the common schools, it would make an annual distribution of $180,372.35 among these institutions. If it be objected that the State does not pay for higher education, then if it should pay for those in the academic institutions who could not pass what is termed the Regents' examination, to the number of 22,336, in 1870, the same as is paid per pupil for those in the common schools, it would distribute annually $141,386.88; or, if it should pay the same as it did for all grades in the normal schools, it would annually distribute $936,995.20. The academies instructed, in the above named year, 1,494 common school teachers for one term, at the rate of ten dollars each per term, equivalent to 484 such teachers for the year at thirty dollars each. If the State had met the actual cost of such instruction, it would have paid $26,779.72; or, if at the same rate that it paid for instruction of teachers in the normal schools, it would be $58,000.

If the increased appropriation made by the last Legislature shall be distributed as contemplated, it will give, on an average, for the scholars in attendance for the ten years from 1860 to 1870, five dollars and forty-four cents, which is one dollar and twenty-eight cents less than what the State paid by tax for the pupils in the common schools for 1869–70. For the expense of average attendance the State will pay, under the new law, exclusive of the appropriation for the instruction of common school teachers, only fifteen per cent of the actual cost of instruction.

II. Its Wisdom.

That this aid is wise as well as just is claimed from the following considerations:

1. *Its Economy.*—From the data above given it is abundantly shown that the State receives more ample returns for the money expended on its academic institutions than from any other source.

The 30,000 youth in yearly attendance upon these institutions, and that pass through them out into the work of life or up to higher institutions, constitute the very flower of our youthful army. Their average attendance upon these institutions is about two years, so that some 15,000 pass to and from them yearly, fully 13,000 of whom

receive no further school culture, but go directly to their professional preparation, business pursuits and the labors of life. Our common schools look to them for the greater share of their teachers, and must continue to do so. In the language of one of the superintendents of public instruction: "If the required information to fit a person for teaching can be obtained in the academies, *sound policy and good economy* are in favor of relying on them for the training of teachers." It costs the State thirty dollars a year to secure the training of a teacher in an academic teachers' class, $122.12 for each one trained in the six normal schools, and at the rate of forty-one dollars for those trained in teachers' institutes.

Again, in the cities where free academies exist, only a little over three per cent of those of school age are found in such institutions. In New York city it is less than one per cent, in the free college proper it being only one-seventeenth of one per cent, while throughout the State, exclusive of New York and Brooklyn, the attendance of such persons upon the academies, though not generally free, is nearly six per cent.

2. It encourages the voluntary method, individual enterprise and munificence. It is very desirable to cultivate in each individual citizen all the public spirit possible. These 200 academies, with their 1,200 teachers and 3,500,000 of vested property, are largely the results of individual or associated enterprise and munificence, and the comparatively small aid rendered by the State hitherto has been one of its chief inspirations. The increased aid secured by the recent legislation will, if perpetuated, greatly increase these voluntary endowments. Every dollar thus secured relieves taxation and does the State just as much good as if raised by tax, while every youth educated in such institutions is educated just as much for citizenship and the public good as if educated by means of taxation.

3. These academies meet a demand which cannot soon be met in any other way. The academic institutions, variously denominated free academies, high schools and academical departments of union schools, constituting a part of the public free school system of the State, can, and doubtless will, be established in all of the cities and larger villages. These have already absorbed a number of the academies proper, changing them into the academical departments of union or free schools, furnishing free tuition to resident pupils, but charging tuition for non-resident pupils. Let this work go on to its full extent, neither striving to retard nor accelerate it by arbitrary control. Only let common sense have her perfect work, and whenever her dictates

demand it, whenever the citizens find that this form will meet their wants better than the academy proper, the change will take place; only let not legislation be discriminating, and the law of natural selection will settle all. Yet, when this has been done and the system of free schools perfected, there will still remain a large residual want unprovided for in the great rural districts. The old-form academy must long stand for the high school of these districts. The very nature of the case precludes the successful application of the village and city system to the needs of the country at large. The freer and more varied courses of study of the academies are better adapted to the pupils of more advanced age from the country than the more primary and strict course of the academic departments of union schools, these being adapted to a much younger class of pupils. The appliances likewise possessed by the former over the latter for taking entire charge of the pupil will, hereafter as now, induce those seeking a school away from home to patronize the academy proper, rather than the academical departments of union schools. From a recent report of the Regents it seems that academical departments throughout the State average only about ten non-resident pupils, while the great body of the students in the academies proper are of this class, thus showing the general and continued favor in which they are held by the rural population, as well as by not a few from the villages and cities. It is very evident that these institutions must and will continue to exist and thrive in spite of all opposition, and that, instead of their influence being deleterious, it will be most salutary and invigorating upon all our educational interests. Assuming thus the continued existence of these institutions founded by private munificence, all the best interests of education demand that the State should supplement this munificence by such aid as shall enable them to become the most efficient possible, furnishing to the youth of the State the very best educational facilities as nearly free as possible. All true culture should be fostered and helped by the State. Thus operating, there is no essential antagonism between them and the free schools proper, and there should be no hostility, but, rightly considered, they are mutual aids, and both should be treated as co-workers in the great cause of education.

III. Academic Culture—Religious, not Sectarian.

1. The crowning objection to giving State aid to these schools is that they are sectarian. While now and then one may come under this ban, the charge is without force in respect to the great body of

them. These objectors do not clearly discriminate between religious and sectarian culture. Many of our academies were founded and are sustained by local enterprise or public spirit, no more sectarian or even religious than was that which founded or located our normal or any other of our public schools, while most of those institutions which were founded through religious, even denominational enthusiasm, have been devoted sacredly to an unsectarian culture. In them, students from all denominations and no denomination meet upon a perfect equality, finding equal privileges and opportunities. Doubtless these institutions, as a whole, are as free from the taint of sectarian tenets in their training as are the normal and other schools. Is not a school officer or teacher coming to his position through denominational impulses quite as likely to work for the public good as one coming through the machinations of party politics? Is the sectarianism of our religionists to be any more dreaded in our school officers than the Philistinism of our politicians? A public officer, though coming into power through political partyism, if he uses his official position not for party ends but solely for the public good, is accounted a faithful political servant, worthy of honor. So an institution of learning, coming into existence through religious, even sectarian inspirations, yet using this existence not for sectarian ends but for the public weal, should be accounted a public good and worthy of generous support. This is an open field wherein all denominations can enter and work for the public good. On this common and broad platform all should be accepted, none rejected.

2. While thus perfectly unsectarian in their culture, yet it is true that they are, to some good degree, though all too imperfectly, striving to permeate their culture with the religious element. This, we claim, instead of being a defect or wrong to be punished, is their crowning glory, for which they are to be upheld and cherished. Just here the battle is gathering. The time is fast coming, indeed, the adumbration of its darkness is already upon us, when the abnormal growth of our rank Philistinism in politics, if permitted to have free course, will drive all religious instruction from our schools. The Bible is to be a forbidden book. All text-books must be expurgated of all Biblical taint, emasculated of all religious inspiration and power. The voice of prayer and praise must be hushed. It further demands that all religious expression be driven from Legislature and court, army and navy, reformatory and charitable institutions. Politics is striving, as with a dirty sponge, to wipe out all religious sentiment from its domain. All must be completely secularized to meet its behests.

The time is hastening, if these bad influences go on unchecked, when God is to be unknown in all of our governments, both national and State, and in all of their institutions. Public and governmental atheism will be the watchword, and "irreligious liberty" will rule supreme. Obligation to God or religious obligation to humanity must be unrecognized. That word of inspiration which breathed into the nostrils of this republic the breath of life and connected it consciously with God, viz.: "All men are created equal and endowed by their *Creator* with certain inalienable rights," must, under this new dispensation, be transmuted into a scientific vernacular suited to the high reign of reason, as follows, viz.: "All men are developed by the laws of differentiation, from the homogenous to the heterogenous, and arranged according to the principles of stable equilibrium, and endowed by the correlation of forces with certain perduring powers," etc. The time will then have fully come when not only the Bible, prayer and praise will have disappeared from the schools and the republic, but it will likewise have become illegal to teach the existence of God, the immortality of the soul, or the religious sanction of morality.

The republic will then have become a godless republic, and all of its institutions godless institutions. Then there will be seen written along the walls of our once glorious school system, with an unearthly hand, words which it will take no prophetic power to translate; and the nation, in that same hour, will have become a second Nebuchadnezzar, ready to be turned out to graze with the cattle until such times as reason shall have returned and God be again acknowledged as the God of nations and their institutions, as well as of individuals.

Our republican institutions are the outgrowth of unsectarian, but very positive religious ideas and convictions. Our common schools, as well as our academies and colleges, in common with all that is best in our modern civilization, are the fruitage of Christianity. The pure white light of religion is decomposed into its primary colors in the various institutions of this civilization. They are the downward and outward working of its divine forces. Our schools are the elder children of American puritanism, and they cannot ignore their parentage without being compelled, as prodigals, to feed on the husks left by the swine of political atheism. They cannot ignore the Bible and religion without becoming atheistic and anti-Christian in their culture. There cannot be simple neutrality. The whole tendency of such attempted neutrality is to inoculate with the virus, not of a simple bias to doubt, but with that of the most virulent skepticism and

rank infidelity. As the body is animated by the soul, so should learning be vivified by religion. All true culture points Godward. All mental activities need to live and move and have their being in the religious, to bask in it as the world does in the sunlight. God has joined religion and learning in most intimate and sacred bands, and man never has, and never can, put asunder what God has joined, without injuring both. What the eye is to the body, what the ear is to the tongue, such is learning to religion. On the other hand, knowledge, without religious control, is a Samson grinding as readily at the mills of the Philistines as at those of Israel.

In this oncoming struggle, our academies and collegiate institutions will be the chief conservators of religious culture. Instead of being maligned and crushed, they should be protected and strengthened, both by individual munificence and State aid.

In conclusion we would, therefore, recommend the adoption by the Convocation of the following resolution:

Resolved, That this Convocation appoint a committee of fifteen to secure, with the co-operation of the Regents, the perpetuity of the legislation already obtained, and to perfect and secure the passage of the supplementary law in such a form as shall unite the academic institutions and the common schools of the State in more intimate and mutually helpful relations, to the end of promoting thereby a more thorough training in the common English, as well as the higher branches of education.

J. ALLEN,
Chairman of Committee.

AGRICULTURAL EDUCATION.

By JOHN STANTON GOULD,
Professor of Mechanics applied to Agriculture, in Cornell University.

Americans most fully believe that they are a practical people; they feel that they are complimented when this attribute is ascribed to them, and mortified when it is denied to them.

In some respects they deserve the title. In general, they prepare their sons and daughters for the special calling that they are designed to follow, by a careful preliminary training in their principles and practices.

Blacksmiths, carpenters, masons, goldsmiths and tailors serve apprenticeships to those trades before they can practice them. Musicians are taught the principles of acoustics, the theory of vocalization, and the practice of the scales, before they can teach music or practice it in public. No one thinks of practicing law, physic or divinity without long and careful training in the proper schools.

No board of railroad directors would expend a single dollar on a track that had been located by a segar maker or constructed by a veterinary surgeon, or by any other than an educated and well-trained engineer.

If any one should attempt to practice either of these trades or professions without this thorough preliminary training, practical men would predict a disastrous issue to the undertaking.

Although in these, and many other respects, Americans vindicate their claim to be a practical race, there are other things in which their conduct is as unwise and unpractical as can well be imagined. They strangely enough imagine that a man can be a successful farmer without any special education whatever, although he is confronted in every step of his progress with the most recondite processes of nature, which require for their elucidation an encyclopedia of all the sciences.

The chief advocates of this strange doctrine are the farmers themselves. If it were possible to summon all the farmers of the United States before this Convocation and to question them severally with respect to their views of agricultural education, a very few would

answer, in all the fervor of a deep conviction, that a thorough education was indispensable for a successful farmer, and that his success would be exactly proportional to the extent of his acquisitions.

A large number (but as compared with the mass a very small class) will tell you that special education is indeed desirable for a farmer, but you will see at once that there is no heartiness in their averments.

They have an idea that this is the proper thing to say, that education is, on the whole, rather ornamental, but down in their hearts they do not really believe that any amount of education would enable a man to raise a greater amount of grass, grain or roots from an acre of land than he would raise if he was entirely uneducated, or that he would reap any greater profit from his farm.

But the overwhelming majority of the assembled mass would ridicule the idea of educating farmers for their work. They would not hesitate to tell you that agricultural education was "a humbug" of the silliest kind, and that all that the young farmer needs is a little practical experience; book knowledge would only make him lazy and conceited.

Since farmers do not demand any education for their sons to fit them specially for the agricultural calling, it is not surprising that teachers have made no attempts to supply a kind of instruction which their patrons do not require, and which would in fact be offensive to them.

The utter apathy that exists in the public mind with respect to the prosperity of agriculture and to the education which must be the foundation of it, is one of the most curious psychological problems ever presented for solution. It is not only amazing but disastrous; it weighs like a millstone on all human progress, and all human civilization, and its removal will do more to elevate and ennoble the race than anything that can be mentioned.

Let us look a little at the facts and see if these things are not true.

We all, indeed, acknowledge, when we are questioned on the subject, that agriculture is of the utmost importance to the whole human race, but we acknowledge it because we are accustomed to do so, because everybody else says the same thing, and because we read it in approved books; it does not exist in our minds as a living, fruit-bearing proposition; it never leads us to take any action to correspond with it.

The importance of an intelligent agriculture appears:

I. Because the great struggle of our race is to provide food, drink and clothing. The necessity for this provision dominates over our

whole lives, and, to a very great extent, regulates all our conduct. When George III desired to bestow some acceptable mark of favor on a laborer on his farm at Windsor, to whom he was much attached, he asked him what he could do for him. "Well," said the man, "if your majesty will only give me as much as I need to eat, drink and wear for the rest of my life, I shall have all I want, and be very thankful for it." "Indeed you may be," said the monarch; "although I am King of Great Britain, this is all I get myself."

Now these are the very commodities that it is the business of agriculture to furnish to mankind. The farmer alone produces meat, breadstuffs, milk and sugar for food; cotton, wool, flax, hemp, silk, etc., for clothing.

If the labor of the farmers were intermitted for a single year, the whole human race would perish. This fact alone establishes the primacy of agriculture beyond a question. You cannot say the same thing of any other calling whatsoever. All other callings might suspend their labors for one year or for ten years, and though the intermission might cause much inconvenience, the framework of society would not be destroyed.

II. All experience shows that population invariably presses upon the supply of food. If you can double the supply of food in ten or twenty years, you will double the population in ten or twenty years. If you diminish the supply one-half, or one-fourth, the population will be reduced in a corresponding ratio. The population of the world is reckoned at 1,000,000,000, and they eat all the food that is raised upon the planet; nothing is wasted, nothing is left over. I remember when the population of the United States was 9,000,000 of souls and we raised just enough to support them. We raise more than four times as much food and of the raw material of textile fabrics as we did then, and our population is now 38,000,000. In other words, the population has exactly kept pace with the supply of food. If the supply of food had been reduced; the population instead of increasing would have diminished in a corresponding ratio. Thus agriculture is invested with the awful power of creation and destruction. No other trade or calling has the power of increasing the world's population.

III. There is an intimate, though generally unnoticed, relation between the cheapness of food and the morality of a nation; or perhaps the proposition will be more striking if we say, the scarcity and dearness of food is a cause of immorality. This assertion is thus proved. If we take the average price of food for each year of a century, and place it in the first column of a table prepared for the purpose,

opposite to that year; if we then place the number of marriages in the next column, the number of illegitimate births in the next, and the number of crimes in the next, each opposite to the year of their occurrence, we shall find that in the years when food is the cheapest, the greatest number of marriages occur, there are fewest illegitimate births, and the fewest crimes are committed. On the contrary, when food is dearest, there are the fewest marriages, the greatest number of illegitimate births, and crimes increase both in number and malignancy. All experience shows that a cheap and abundant supply of food is conducive to higher civilization, manifested in a greater refinement of manners, a more elevated and comprehensive system of education and a higher social enjoyment.

It was the abundance of corn produced by the overflow of the Nile which nourished the arts and sciences of ancient Egypt, that made her the mother and the mistress of early civilization. The wondrous intelligence and social supremacy of Athens had its root in the fertile soil of Attica, and in the intelligent skill of the tillers of that soil.

On the other hand, barbarism is always the result of a precarious food supply. The wandering Indian and the stupid Hottentot never can be elevated into civilization until his food becomes abundant. When the plains of Babylon were artificially irrigated, they supported a teeming population that was educated, happy and prosperous; when that system of irrigation was abandoned, the population grew sparse and lapsed into barbarism, and that once fertile and prosperous region is now the habitation of wild beasts.

IV. The importance of agriculture is illustrated by the enormous bulk of its productions and their aggregate commercial value.

Our production of potatoes, hay, corn, wheat, rye, oats and barley, in the year 1869, was 67,348,000 tons. Their aggregate value was $1,411,333,000.

I have not included the weight or the value of the meat, the wool, the sugar, the honey, the cotton, flax, hemp or silk; the milk, cheese, butter, eggs and hides; the fruits, market truck or tobacco raised upon our farms. If the value of these and similar articles of production are taken into the account, we shall have a total annual value exceeding $2,500,000,000, which very considerably exceeds the amount of our national debt.

In view of the facts stated under these four heads, have we a legitimate claim to the character of a practical people while we utterly ignore the claims of this great foundation interest for special educational facilities?

Ought not the nation, as such and in its collective capacity, to watch with eager interest over the success of a calling that lies at the very root of civilization, of commercial prosperity; nay, at the very existence of society?

We can show most conclusively that there is a real necessity for this national care and oversight, because the soil is not at the present moment yielding more than half or even a quarter of what it is capable of producing, and that the present cultivated area might support double or quadruple its present population in a vastly higher degree of prosperity than it now does.

These are the facts: The average production of hay per acre in the United States was, in the year 1869, 1.23 tons per acre. This was also the average production for the State for New York. This was a year, it must be observed, in which the production, owing to very favorable climatic conditions, was nearly twenty per cent better than ordinary.

Every one knows that this average production is far below the production of our best and most intelligent farmers, who rarely cut less than two or three tons to the acre.

The annual value of the hay crop of the United States is $400,000,000. If, therefore, we could make two blades of grass grow where only one grew before, we should add $400,000,000 to our annual revenue. Such an addition would benefit every individual in the country. It would pay our national debt in five years. Now, our best farmers not only raise two, but three blades of grass where the average farmer raises only one. But the produce of our best farmers is far below the maximum capacity of the soil. Five tons have often been cut from an acre in this country, and from a celebrated meadow in Edinburgh, twenty tons have been taken annually in seven successive cuttings. If we could teach our farmers to bring their averages up to this point, we should, to borrow Dr. Johnson's phrase, find that our meadows possess "potentialities of wealth far beyond the dreams of avarice."

This great discrepancy between the actual and the possible production is quite as apparent in other crops as it is in the grass crop. The value of our corn crop, for the year 1869, was $601,839,030. The average production per acre was 28 3-10 bushels per acre. This is less than one-third of what our best farmers are accustomed to raise on an acre. One hundred bushels is no uncommon crop. The State Agricultural Society in Indiana, in 1860, gave a premium on a crop of 263 bushels to the acre. If our average crop could be increased (as

it might be) threefold, it would add $1,200,000,000 to our national income.

The same thing is true of our wheat crop. The average yield throughout the United States is twelve bushels to the acre. But many of our best farmers raise forty bushels. Thomas Powell, of Niagara county, N. Y., took a premium from the New York State Agricultural Society for a crop of seventy bushels to the acre, and 162 bushels to the acre have been raised in England.

I could in the same way prove the same discrepancy between the actual and the potential production of all other crops, but the examples already given will suffice. It is enough for my present purpose to show that by raising the average production, through the whole country, of hay, corn and wheat alone up to the standard of production of our best farmers, we should increase our annual agricultural revenue more than $2,400,000,000 per annum. As "practical men" we ought at least to make an effort to secure this brilliant prize.

What is the reason that the average farmer does not get more than one-third as much from an acre as the first-class farmer does? The answer may be given in a single word, and that word is, ignorance. The reason that they do not raise maximum crops is, that they do not know how to do it.

You cannot talk with the great majority of our farmers for half an hour without seeing that they are ignorant of the elementary principles of agriculture; that they know little or nothing of those matters which lie at the very base of successful and remunerative agriculture. I will give some examples of this.

There are about 6,000 species of grass known to botanists. From 125 to 150 species are indigenous in the State of New York. There is hardly a farm in the State where from ten to fifteen species do not grow. Yet farmers who have lived on these farms and mowed the meadows for fifty years, do not know the names of these different species; they cannot tell the plain marks by which they are severally distinguished.

You can hardly find fifty farmers in the State who can tell the difference between Meadow Fox-tail (*Alopecurus pratensis*) and Timothy (*Phleum pratense*). And yet there is nothing about grass that a farmer needs more to know.

The former is of great value as a pasture grass. It will furnish a good bite for cattle three or four weeks earlier in the spring than the latter will, and when gnawed off clean on one day will afford a good bite again the day but one after. The latter, though not valuable as

a pasture grass, is of pre-eminent value as a meadow grass. It will give twenty-three lbs. more of dry hay to 100 lbs. of grass than the former. It contains twice as much flesh-forming matter, three times as much of fat-forming, and two and a half times as much heat-making material. Yet farmers will sell both kinds at the same price, and will take no more pains to encourage the growth of one than the other. They suffer of course an enormous loss in consequence. If farmers are ignorant of such vital facts as these, it is certainly a pretty plain proof that better agricultural education is required.

They are as ignorant with respect to grain as they are about grass. There are about 150 varieties of wheat cultivated in this country. Some of them are adapted to sandy lands, some to heavy, some to light loams, and some to stiff clays; some to wet lands and some to moist lands. Some have stiff straw and some soft and weak straw; some make white and some dark flour, some abound in gluten and some in starch. A barrel of flour made from some kinds of wheat will make 250 lbs. of bread, while others will make 332 lbs. But these special adaptations are not accurately understood by any farmer, and are only approximately understood by a very few. The great mass of them sow such seeds as can be most easily procured, without even a thought of any special adaptation to their own soils, circumstances or wants.

I do not know how many different kinds of maize or Indian corn are raised in the United States, but I have seen nearly 100 different varieties. It is the same with corn as with wheat. Farmers do not know which of these varieties are most nutritive, or which are the most prolific under given circumstances. Nevertheless they vary greatly in both these respects. The analysis of Dr. Emmons shows that there is thirty-three per cent more of flesh-forming matter in the white flint corn than in the Ohio Dent, and similar differences may be found running through the entire list.

These specifications of the ignorance of farmers respecting the matters that it is most necessary they should know, might easily be extended, but I have already said enough to show the enormous losses that are entailed on them as individuals, and upon the whole community at large in consequence of their lamentable ignorance of the first rudiments of their profession.

The only institution organized in the State to meet a want which I have shown to be so vital, is the Agricultural College of Cornell University, which could easily accommodate 300 students, but which

actually has about twenty. There are 216,250 farms in the State, and therefore one student of agriculture to 10,812 farms.

This is a very sad showing, and very discouraging to the ardent friends of agriculture. There is no trade or profession practiced by men that involves the practical application of so many branches of science. The farmer cannot understand the origin and nature of the soil he cultivates without the aid of geology; he cannot understand the germination and growth of plants, or the proper application of manures, without a knowledge of both inorganic and organic chemistry. To identify weeds and useful plants, he must be familiar with practical and theoretical botany. Insects often ravage his crops; he must learn entomology in order to guard against their ravages. He breeds and rears domestic animals; he needs, therefore, a thorough knowledge of anatomy, physiology and hygiene, if he would reap the largest profits of which the business is susceptible. His processes are mostly dependent upon the weather, and he should therefore be acquainted with the principles of meteorology. In short, there is scarcely a single branch of science that will not be profitable to him in some stage of his operations.

We see the need of special agricultural education, but how shall we account for the entire apathy of the farmer with regard to it? Why do the farmer and his sons reject the aid that is offered to them?

There are, undoubtedly, many distinct answers to these questions, but I believe that the entire exclusion of agriculture from our common schools is one of the causes of the apathy complained of. In our primary schools there is not only elementary instruction given, but a higher knowledge is foreshadowed; curiosity is thus awakened, and desire to possess this knowledge is aroused. The graded school, while it supplies the want, also foreshadows a wider range of knowledge which is supplied at the academy, and the academy in its turn foreshadows and excites a taste for the higher knowledge taught in the university. It is this hierarchy of schools that excites the desire for knowledge, as well as affords the means of gratifying it. If there were no seminaries intermediate between the common school and the university, the number of students in the latter would be very small.

I see no other way to fill up the present agricultural college, and to promote the establishment of new ones in different parts of the State, but to resort to the same system. The sons of our farmers must be taught in the common schools that there is such a thing as agricultural science, which is of great practical utility, and some specimens of this science should be interwoven into the course of study.

This should be extended in the course of instruction at the academies, and in this way the sons of farmers would be led to seek for the complete course of agriculture provided in the agricultural college.

Some years ago, an admirable little manual of agricultural chemistry was prepared by the late Professor Johnston, of Edinburgh, and was reprinted in this country, which would form an admirable basis for the teaching of agricultural chemistry in our common schools. All the apparatus required for performing the experiments described in it can be purchased for twenty dollars. Two short lessons a week, illustrated in a lecture from the teacher, of about ten minutes in length, would take the pupil through it in a year. Of course it is very elementary, but the boy will get some real and fruitful ideas of the more important alkalies, earths, acids, and of their behavior in each other's presence; and what is still more important, he will get glimpses of problems beyond the book, which will excite his curiosity and make him anxious to acquire a fuller knowledge when he is transferred to the academy.

Half a day in summer could be profitably devoted by both teachers and scholars to gathering all the varieties of grass and grain that grow in the neighborhood. These should be illustrated from time to time in short ten-minute lectures, and the specimens preserved in cabinets kept in the school-house for that purpose.

Once in each summer month the teachers and scholars should make an excursion into the fields and woods, to collect the insects of the vicinity, which should be named and preserved in the school-house, and similarly illustrated by short occasional lectures. Collections of geology should be made and illustrated in the same manner.

Of course the scholars would get but a slight elementary knowledge of these matters from such instruction, but the initial step would be taken, the seed would be planted, and there are good reasons for believing that it would bear fruit an hundred fold.

The work thus commenced in the common school should be carried on still further in the academies. Their museums of agriculture should be much fuller, including all the plants of the county, specimens of all the timber trees and their seeds, of the rocks and fossils of the county, the various kinds of mineral manures in use, models of the more important agricultural implements, and wax models of the fruits, which the young ladies, ingenious in wax work, would be glad to supply if they knew that they would be valued and preserved.

A pretty full course of lectures on organic chemistry, botany and economic geology, and on entomology with reference to agriculture,

should be given annually, and the whole course of the teaching should be directed to the cultivation of habits of attention and observation.

If this course were adopted in our common schools and academies, the Agricultural College of Cornell University would not only soon be filled to overflowing, but other similar institutions would be imperatively required in every section of the State.

When the young farmer is thus prepared to enter upon his career, by a thorough knowledge of all the collateral sciences, there will soon follow a vast augmentation of our crops and revenues, the average production of our fields will rise to the level of maximum production, and all the sources of our civilization will be elevated in a corresponding ratio.

SHOULD STUDY IN COLLEGE BE CONFINED TO A UNIFORM CURRICULUM, OR SHOULD IT BE MADE TO ANY EXTENT ELECTIVE?

By Frederick A. P. Barnard, D. D., LL. D., L. H. D.,
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The question whether the instruction given in our colleges ought to be confined to an invariable curriculum of study and made uniform for all the undergraduate students, or whether, in regard to any part of it, or at any period in the progress of advancement, the choice of the student himself should be consulted as to the branches to be pursued and the extent to which they are to be followed, is one which has agitated the educational world for nearly or quite half a century, without being apparently any nearer a settlement to-day than it was when the controversy began. In some respects the conditions of the question have in the mean time undergone changes of material importance; and yet the discussion proceeds as if nothing of the kind had occurred. On the side of the conservatives, the curriculum of collegiate study continues to be spoken of as a monument of the wisdom of centuries, on which it would be little short of sacrilege to lay a profaning hand; while, in the view of the party of progress, even the highest wisdom of the ages of comparative ignorance is liable to appear no better than folly in the light of advancing knowledge. To listen to the debates, or to read the published papers bearing on the question at issue, one would hardly infer that the curriculum of the present day is anything more or less than the curriculum of sixty years ago; and yet, no conclusion could be more singularly mistaken than this. So large have been the changes introduced into the course of instruction of our colleges within the period spoken of, that the studies which, at the beginning of this period, constituted the strong meat of the intellectual repast set before the undergraduate student, now serve for little more than to give flavor to a refection made up mainly of a very different description of food. This change, though quite disregarded in the discussion of which there is present question, has by no means passed unnoticed by the friends of that ancient learning of which the interests have been so seriously imper-

iled by it. In England, the change has gone on faster perhaps, or at least farther, than it has yet with us; so that at present, at Oxford, it is possible to obtain the degree of Bachelor of Arts without studying any Latin or Greek author, or any Latin or Greek history, after the first year of the course; while, moreover, the classical study of this first year itself is reduced to a minimum. Of the prospect of the future of classical learning in that country, Dr. Lightfoot, in his recent essay "On a Fresh Revision of the English New Testament," makes the following observation:

"I should be glad to think my apprehensions groundless; but there is at least some reason to forebode that Greek scholarship has reached its height in England, and that henceforth it may be expected to decline. The clamor of other branches of learning, more especially of scientific studies, for a recognized place in general education are growing louder and louder, and must make themselves heard; and if so, the almost exclusive dominion of the classical languages is past."

This passage is quoted by the learned Dr. Spencer, Professor of Greek in the College of the City of New York, in an able article on the value of classical study in a course of liberal education, contributed by him to the Church Journal of New York, with the added comment that "substantially the remark applies to our own country, and opens up a question of no little interest and importance, whether we are to foster, encourage and advance classical learning for its own sake, or abandon it as effete and of no further use in the days in which we live." Nor can we soon forget the weighty words to the same effect of that ripe scholar and experienced educator, Professor Tayler Lewis, pronounced in this place one year ago in one of the ablest communications ever laid before this body, in which he says that "the attacks on [the classics] and the yielding to the popular clamor by men who ought to have resisted it, have had a most deteriorating effect; and this is seen in the partial and inadequate treatment to which they have been necessarily reduced, both in the preparatory and the college course. In this way they are made to furnish an argument against themselves. See to how little they amount, it is triumphantly said. There is truth in the taunt; and we have therefore no hesitation in maintaining that, unless classical education is to be made more of, it had better be wholly banished from the college course." Professor Lewis spoke of the magnitude of the change which has taken place within his own time. He has himself taken classes "through the whole Republic of Plato, and other

important dialogues." Also, "through the whole of Herodotus, the whole of the Iliad, and, in some instances, the whole of both Homeric poems, together with an incursion into the Greek drama much beyond the usual recitation bounds;" and these things he contrasts with the present Greek programme of our colleges, "the very best of them," consisting of "a few books of Homer, a portion of Xenophon's Anabasis or Memorabilia, a book perhaps of Herodotus or Thucydides, an oration of Demosthenes, one drama or less from each of the great tragedians: these read piecemeal in disjointed daily portions, the literary interest all lost or overlooked, because the whole attention is absorbed or the time necessarily occupied in thumbing the grammar, while the lexicon is worn out in looking up new words, or old words over and again."

As corroborative of this representation may be given the experience of the present writer, in the college in which he was himself a student more than forty years ago, compared with the amount of classical reading prescribed in the programme of the same college at the present time. At the earlier period, there were read all of the two large volumes of Dalzell's Collectanea Græca Majora, embracing most of Xenophon's Cyropedia, Anabasis and Memorabilia, with large extracts from Herodotus, Thucydides, Lysias and Isocrates, Plato, Aristotle and Longinus, and the poets Sophocles and Euripides; besides several books of Homer's Iliad, and the oration of Demosthenes on the Crown. In Latin, at the same time, the reading embraced eight books of Livy's History, the entire volume of the poetical works of Horace, including odes, satires, epistles and the Art of Poetry; Cicero, de Officiis, de Senectute, de Amicitia, de Oratore and de Republica; and finally Tacitus, the History, Agricola, and de Moribus Germanorum. In the same college, at the present time, the classical reading appears to be in Greek, four books of the Odyssey, half the first book of Herodotus, four orations of Demosthenes, one book of Xenophon's Memorabilia, a tragedy of Æschylus, and one of Sophocles. In Latin, one hundred pages of Livy, three books of the Odes, and the Satires and Epistles of Horace, Cicero de Senectute, one term of the Satires of Juvenal, and one term of the History of Tacitus. In the Junior year, Latin is read through one term, and Greek through two (there being three in the year), and in the Senior year Latin is read for one term and Greek not at all. The change here indicated is very great—great enough to justify the proposition above quoted of Professor Lewis, that the classics had better be given up in our colleges, or else read more.

Now, it is impossible that a change of this extraordinary magnitude in the programme of collegiate instruction could take place, while the expediency of enforcing upon all undergraduate students a fixed curriculum of study is under discussion, without in some manner affecting the solution proper to be given to that question. Suppose that an undergraduate student desires to pursue classical reading to something like the extent formerly given to it, is he to be denied the privilege of doing this? Fifty years ago the question would have been presented in the inverse form (as it often is yet), and would have stood, suppose he desires a more extended course of scientific study, shall he not have it? To this question the conservative reply has been constantly, and very positively, no; but now that the tables are very liable to be turned, we may reasonably ask whether it is any longer proper that this reply should be persisted in.

Before venturing to answer the question thus proposed, it is necessary to call to mind the argument by which, when this controversy began, the value of the curriculum of collegiate study, as it then existed, used to be maintained; for this argument continues still to be employed without reference to the fact that the thing to which it relates has been so changed as to render it, to a great degree, inapplicable. This argument rests upon the fundamental assumption that the great object of collegiate education is to discipline and not to inform the mind. And from this point of view the special merit, as educational instrumentalities, of the languages of ancient Greece and Rome, consists not in the fact that they are languages of great and cultivated peoples, or that they embody a copious and elegant literature, but simply in the fact that they are eminently artificial and logical in structure, and that they present a larger number of curious and varied problems for the exercise of the mental powers than any other known languages, living or dead, or even than any other subjects, whether philological, or literary, or philosophical, or scientific, which could possibly be chosen for a similar use. This, then, is the recommendation of these languages for purposes strictly educational; and it is important to observe that it is a recommendation which would be equally in their favor if the literature behind them were absolutely worthless; or even if they had none at all, any more than the Choctaw or the Cherokee.

Besides the fundamental assumption above mentioned, it must be further assumed that true education is strictly impartial, aiming to draw out and bring into exercise equally every mental faculty of the student, with a view to produce that symmetrical development and

just balance of the powers which constitute what has been called "a rounded culture." By inference, therefore, the elementary training of all minds should be precisely the same; and hence an invariable curriculum, uniformly enforced, becomes a logical necessity. And inasmuch as the study of language is admitted to be adapted to bring into salutary activity the largest number of the mental faculties, it seems in this view to be advisable if not necessary, or at any rate it is claimed to be the dictate of experience, that language in general, and especially the tongues of ancient Greece and Rome, shall constitute the main element in the system of liberal education. To propose, therefore, to permit the student to select for himself the studies he will pursue, is, upon this theory of education, simply unreasonable and absurd. If, in the exercise of this freedom of option, he selects the prescribed course, his freedom is useless to him. If he selects another, it is prejudicial.

Such reasoning, however, derives all its force from the hypothesis that the curriculum of study prescribed is the best of all possible curricula. It loses it altogether the moment this best of all possible curricula ceases to be maintained in its original integrity. For supposing that, under the constraint of influences too powerful to be successfully resisted, however presumably pernicious, serious modifications come to be admitted into the course; it is immediately possible that the student, in the exercise of a permitted freedom of election, may correct this evil by returning, in his own case, to the course as it stood before. Under such circumstances, to deny to him this freedom is neither more nor less than to refuse to him the opportunity of availing himself of that species of intellectual culture which is at the same time asserted to be the best that he could possibly enjoy.

Resistance, then, to the elective system must, if still persisted in, be based upon a different ground from this. It will probably take the form of the assertion that the freedom sought will never, or not in one case in a thousand, be exercised in a reactionary direction; but will rather, in all probability, be used in such a manner as to exaggerate instead of reducing the evil which the course has already suffered through the modifications forced upon it. The language of the argument will probably be something like this: The curriculum has indeed been tampered with and vitiated till it is far from being at present what it was and what it ought to be—a perfect scheme of educational training; but it is a great deal better, after all, than any which a student is likely to make for himself, and, therefore, we will not trust him with the direction of his own education. The study

of language, it will be said, is laborious, and to many it is dry and dull. There are other studies with a kind of dazzle about them which is attractive, and which promise to occupy the time in a way that is rather amusing than toilsome. These, of course, will be chosen by the average learner, who is to be credited with no desire for his own substantial improvement, but whom it is our duty to coerce to his own good. The argument is therefore no longer in favor of "*the* curriculum," that is, the best possible curriculum; but in favor of "*a* curriculum," that is, *any* curriculum whatever, as against the system of election.

It is never difficult, of course, to prove anything, when we are permitted to state hypothetical propositions, and then immediately proceed to treat these assumptions as facts. The argument above given in outline as likely to be used, and which we very well know actually is used in the discussions which go on upon this subject, happens, unfortunately, to be flatly contradicted by all the experience which we have yet been able to secure on this important subject. It is contradicted by the experience of Columbia College in the experimental admission of the elective principle into the later portion of the course during the last few years. It is contradicted by the much larger experience of Harvard University for a much longer period.

When experience and theory are in conflict, there can be no doubt that there is error somewhere. Either the theory is wrong, or we are wrong in our mode of applying it. It is even possible that our practice may not be conformed to our theory when we suppose it to be so; and this I do not hesitate to assert to be the case in regard to our theory of liberal education. For while this theory justly demands the impartial culture of all the faculties of the mind, the practice denies to the faculties which are earliest awake any systematic culture at all. The practice, in fact, tends rather to repress than to encourage the development of these faculties; and, in this respect, it could hardly be made more prejudicial if it had been expressly devised with a view to this effect.

In the order of nature, it is the powers of observation, the perceptive faculties, which first manifest themselves in activity. And this is a beneficent provision, since it is only through the exercise of these that material is to be gathered for the employment of the higher powers. Except for the ideas which originate in impressions on the senses, there would be no mental growth at all. And but for the eagerness and interest with which every child observes without being stimulated or coerced to do so, this growth would be much slower

than it is. These truths are so elementary and so universally accepted that they hardly need to be explicitly stated. And yet, in the plan of our system of liberal education, they hardly seem to be recognized at all. If they are truths, they certainly demand that the subjects earliest presented to the mind should be those which deal with material things, with outward nature and the objects which make it up; with their similarities and their diversities, their phenomena and the laws by which these are governed. Yet nothing of this sort enters into the early training of those of our youth who are designed to enjoy the benefits of the highest educational culture for which our system has made provision. Language is made for them, even from the tenderest years, the almost exclusive subject of study; and this difficult subject is made still more difficult for them by the form in which it is presented. The order of nature is thus completely inverted. An attempt is made to force the reflective faculties of the mind into premature activity; an attempt to which they but feebly respond, or fail to respond at all; while the opportunity, through the spontaneous activity of the powers of observation, of acquiring a vast fund of valuable ideas to serve as material for their later and healthful exercise, is deliberately thrown away.

This error, however, belongs to a period of the educational course, which it is not within the design of the present paper to consider. It was noticed at some length in a communication, addressed some years since to this body by the present writer, on the subject of the studies proper to be pursued as preparatory to admission into college; and is here alluded to only in illustration of the fact that our educational theories and our educational practice are not by any means in invariable harmony.

But the college course itself furnishes similar illustrations in sufficient number. Every new subject of study which has been admitted into the course since the century began, has been admitted in acknowledged violation of the theory on which the course is assumed to have been originally founded. For though among the advocates of these innovations there are not wanting those who maintain that the new subjects are just as valuable as the old, considered as educational instrumentalities, still it will not be denied that it is to the value claimed for them as matters of positive knowledge, and not to their usefulness as instruments of mental discipline, that they owe the place which they have secured. Chemistry has been admitted, for instance, into the course, on the ground that it is important that every educated man should know something about the elementary

composition of the matter which surrounds him; anatomy and physiology, because he ought to understand the structure of his own frame and the functions of its several organs; and mineralogy, geology, botany, physics, etc., for similar utilitarian reasons. Moreover, more than half the argument in favor of the extended study of the ancient languages is founded in these later times upon the positive value of the literature which this study unlocks. This, in fact, is the principal theme of the able article of Professor Lewis, already referred to. In that article, the learned professor has drawn a strong contrast between two schools of classical students; schools which may be called the critical and the literary; those on the one hand who study mainly for the sake of the language, and those on the other who study for the sake of the substance. In illustration of his idea, he says "it may all be expressed by saying that, in our colleges, we study Homer as a means of learning Greek; we do not learn Greek as a means of reading Homer with facility." In his view this practice is a great error, having for its result to prevent the student from "reaching that highest culture which comes from a sound familiarity with this rich old literature." But this highest culture, he distinctly admits, consists in the acquisition of knowledge, and not in the practice of mental gymnastics; in storing the mind with treasures, and not in exercising its faculties merely for the sake of exercising them.

If it were worth while, other particulars might be enumerated in which the practice of our collegiate course of instruction violates its accepted theory. So great is the multiplicity of subjects at present taught, as to destroy altogether, especially in the later years, the character claimed for the course as a system of mental discipline. It is no matter how well adapted in its nature any exercise may be to develop into strength any faculty of the mind or any organ of the body, this consequence can only follow upon its long continued practice and persistent use. It is not by the occasional wielding of a heavy hammer that the muscle of the smith's arm is thickened; it is by the practice of wielding it for days and weeks and months. It is not by an occasional glance cast across the ocean's expanse, that the eye of the sailor acquires its proverbial acuteness; it is by earnestly scanning the horizon, throughout many weary watches, during the protracted voyages of half a lifetime. In like manner, if, from the prosecution of any given study, we are to be justified in looking for any subjective benefit to the student, it is an indispensable condition of this result that the study shall be persistently pursued. But we know very well that, in regard to most of the subjects of study

embraced in our curriculum, such persistency is by no means secured. It requires, indeed, but the use of a very little and very simple computation to prove that it is impossible that it should be: since when we take into consideration the amount of time at our disposal and the number of topics we profess to teach, it is easily shown that an equal distribution would give to each but about two or three weeks in all. A study pursued through a period of time so limited may, perhaps, add something of value to the amount of the student's knowledge; but it can be of very little advantage considered as a means of systematic mental discipline.

It is time, therefore, as it appears to me, that we should revise our theory of collegiate education, with a view to make it conform a little more nearly to our actual practice; or that we should modify our practice to make it harmonize more nearly with our theory. The most judicious course apparently would be to admit, to some extent, both species of change at the same time; and with this would necessarily follow, as I shall endeavor to show, the introduction into the system of instruction of the element of plasticity, permitting it to be varied in its character to accommodate the exigencies of different minds. The doctrine that all varieties of mind may be profitably subjected to the same educational regimen, is a doctrine which it is not safe to admit, unless we confine its application to the most elementary stages. And here, in order to make myself understood, I cannot do better than to repeat the language in which I have endeavored succinctly to express my views on this subject elsewhere, which is as follows:

"There is a period of early life during which, without any artificial or intentional culture at all, the powers of the body and those of the mind simultaneously and spontaneously unfold themselves. During this period, if certain muscles of the body or certain of its limbs be kept in incessant activity, and certain others in continual repose, the results will be an abnormal and possibly a monstrous growth. But if the child be suffered to grow up under ordinary conditions so as to reach adult years with tolerably symmetrical proportions, the subsequent effect of unequal activity of the different members of the body will no longer be an unnatural development, or a marked disturbance of the balance of the physical powers, but rather a greater skill or aptness in the use of those which are most employed. Nor even in regard to this, is use or practice or exercise, after a very early period of life, sufficient to produce results which, while the system is still plastic, are accomplished almost imperceptibly and with infinitely

less effort. There are arts, such as glass-blowing, which can never be mastered except by persons who have grown up to them from early childhood. And no fact is more familiar than the facility with which the pronunciation of foreign tongues is acquired by infantile lips; while it is a hopeless undertaking for an adult, no matter what amount of practice and perseverance he may expend upon the effort, perfectly to master the same accomplishment.

"Now precisely the same holds true in regard to mental development. As there is a period of infancy during which the child is incapable of supporting his own weight, so there is one in which he is scarcely conscious of his own existence. And as, with the physical growth, the organs of the body acquire strength, and come by degrees under the control of the will, so, correspondingly, in the natural and spontaneous growth of the mind the faculties unfold themselves and expand into vigor, in simple obedience to the principle of development divinely implanted in the soul in the moment of its birth. With the progress of years this growth goes on; and the mind, like the body, attains an adult stage, whether it be subjected to external influences controlling its habits—that is, to educational influences—or not. There comes a time, at last, beyond which educational influences are proverbially vain. But in the very earliest of all they are almost omnipotent. This is the period during which, in obedience to nature's law, the faculties are growing; and at this time the educator may force them, with some degree of success, to grow into any mould which he may choose to throw around them. Yet when expansion has ceased, moulds will be placed for them in vain; the mind will retain the contour which nature and circumstances have given it; and from this point onward the business of education is no longer to form it, but to make the most of what it is. There is here room, doubtless, for the educator to do much; but his proper business is to give fair play to the faculties such as they are, and such as they must continue to be; rather than to repress the salient characteristics, and to waste both precious time and weary labor in the endeavor to bring out others which have lost, or which have never possessed, the power to respond to the solicitations of the cultivator."

If these observations be just, then the true theory of education is not that theory which aims professedly to secure for all minds identically the same description of development, or to force every mind into absolutely the same mould; but that, on the other hand, which anticipates, as inevitable, differences which no external influences can ever compel effectually to disappear, and which adapts its culture to

these ineradicable and irrepressible differences. The system of training which such an educational theory would provide may be described as follows: During the earlier period of mental growth, when the native capacities, the original distinctive endowments, are unascertained, it will aim with equal faithfulness to draw out every faculty which belongs to the human intelligence. This effort will be impartially persisted in until it shall have become perfectly and palpably manifest that all do not equally respond to the culture bestowed upon them. For that this will in due time be the case, experience always proves, and reason might lead us to anticipate. There is no more just ground for believing that all men will be born with equal or similar powers of mind, than that they will be born with absolutely identical characteristics of body; and while the brain continues to be the organ of mind, and the brains of infants sensibly differ, we must expect that there will be born with them intellectual differences which no system of educational training can possibly eradicate. Therefore it is not the business of education to undertake to eradicate these differences; and when the system of elementary discipline has brought them fairly out, and demonstrated beyond any question what manner of man it is with which we have to deal, it is no less unwise to expend our principal subsequent labor upon his most unpromising faculties, in order to realize the idea of a "rounded culture," than it would be in an army to subject to the most thorough and persistent drill the feeblest and most cowardly soldiers, to the neglect of the strong and the brave.

The first business of education is, therefore, to find out what the individual is fit for; the next is to make the most of him in that for which he is fit. And according to this true theory of a subject which plausible speculation has done very much to obscure, a special system of training, adapted to the idiosyncracies of the individual, is just as distinctly indicated for the later years of a liberal educational culture, as a general one, equally enforced on all, is for the earlier. And it further follows that if, at this later period, the student is permitted to follow the bent which his preceding training has served to develop, his choice will fall upon those studies which are in harmony with his bent, without any reference to the question whether they are, in the common sense of the words, "easy" studies or "difficult." For these terms, "easy" and "difficult," as applied to matters which concern the understanding, admit of two quite different modes of definition. No mental pursuit is easy if it be distasteful, no matter how small may be the labor its prosecution demands; and no similar pursuit is

difficult if pleasing, even though to follow it may exact the severest and the most persistently sustained exercise of the faculties. And in corroboration of the truth of this proposition, it may here be stated that, in Columbia College, under the system which permits the members of the senior class to select for the most part the studies which they prefer to pursue, there is no lack of volunteers for a subject commonly reputed to be so difficult and so forbidding as the calculus, or so obscure as the metaphysics; nor is there, on the other hand, any observable predominance in the number of those who select a branch so fascinating as physics, or so practical as technology or chemistry. The distribution has been, in fact, approximately equal among all the studies presented for option; and what is perhaps more important, it has been very much such a distribution as the faculty themselves would have made, had they, instead of the students, exercised the option. And this result is one which we may always reasonably look for, when parallel courses of study are offered to the choice of students during the later years of the academic course, whatever might be true if the offer were made at the beginning. For the effect of the early years of training is to bring out the character of each individual mind, and to determine what are its native idiosyncrasies and what it is possible to make of it. And though the doctrine that all the faculties of all minds should be developed as far as possible by appropriate educational exercise and discipline is a true doctrine, yet the doctrine that all faculties of all minds are equally capable of development is a fallacy which no enlightened educator will think of maintaining. That every faculty should receive its fair amount of fostering attention is certainly just and right; but to expect that this fair amount, or that any amount, of individual culture, however laborious, will secure to every individual an equal power or chance of success in any given direction, as for instance in poetry or mathematical research, is as unreasonable as to expect that every sapling in a nursery may, by proper care, be made equally prolific of fruit. After all that has been said about the desirability and the importance of a symmetrical mental development, and of the duty of shaping the educational culture with a view to insure such a development, the simple fact is that all minds develop themselves more or less unsymmetrically, just as certainly as that different minerals crystallize into different geometrical figures; and that it is just as hopeless for the educationist to look for that ideal conformity and perfection of mental proportions among his pupils, which has been so much insisted on as the end at which edu-

cation should aim, as it would be for the chemist to attempt by his science to compel all his salts to crystallize into spheres.

A hundred years ago, or possibly so lately as the first ten or twenty years of this century, the argument in favor of a uniform course of instruction in our colleges had a better foundation in just educational principles than it has at present; for at that period there can be no doubt that boys were entered in the colleges at an age which would now be considered absurdly early, and at which they would now be generally refused. This assertion is none the less true because at the same time there were not a few who entered at ages which might properly be called absurdly advanced. The latter fact arose from the scarcity of good schools of secondary grade. But of the younger class, many entered at eleven or twelve years of age, and some as early as ten; and in systems of collegiate instruction, as of collegiate government, the necessity of accommodating methods to the exigencies of the students who are least advanced in age or in culture is unavoidable. To boys between the ages of eleven and fifteen, or twelve and sixteen, it may fairly be argued that the curriculum of study may best be made uniform, and be prescribed by the authorities without reference to the preferences of the learners; since these latter will still be in that state of mental immaturity in which it is yet to be ascertained what they are most fit for and what is most fit for them. But it is hardly conceivable that a plan of education most perfectly adapted to the circumstances of boys like these, can be equally suitable for young men four, five or six years older. It is nevertheless a fact that the average age of graduation in the colleges of New York and New England, at the present time, is as high as twenty-one years. From an examination made of the record of entrance matriculation at Columbia College for the past several years, it appears that the average age of admission to the freshman class has been something over rather than under seventeen years. And the results of some inquiry in other institutions lead to the conclusion that the general average, at least in the colleges of New England and probably in New York, is rather above than below this. Thus the very age which was, sixty or seventy years ago, a very usual age of graduation at college and of entrance upon professional studies, is now the ordinary age at which studies begin. Surely, if the mental characteristics of young men are ever to be discovered, and if it can ever become safe to intrust them with some participation in the direction of their own education, this period ought to arrive at least a year or two before they become citizens and voters.

In what has thus far been said, no question has been raised as to the correctness of the assumption, always expressly or implicitly made in this discussion, that the curriculum of collegiate study as it existed in the past century was not only the best which could possibly be devised with a view to the discipline of the mental faculties, but that it had been made so of design, and upon a careful study of the philosophic principles of education. The fact is, however, that this curriculum was entirely the creation of circumstances. Our earlier American colleges were founded on the model of those of the British universities; and here, as there, their avowed design at the time of their foundation was not merely the general design to raise up a class of learned men, but specifically to raise up a class of learned men for the Christian ministry. Hence the kind of education at which they consciously aimed was not the discipline of the mind, but simply the filling up of the mind with the lore of other times. Here, as there, accordingly, their teachings consisted largely in the classics, to which were added—as we read in the historical sketches of Harvard and Yale colleges, by Dr. Palfrey and Prof. Kingsley—Hebrew, Chaldaic, Syriac and dogmatic theology. Dialectics and a little geometry completed the course. The demand for a lay education occasioned the relegation of systematic theology to independent though associated institutions; and along with this went the oriental languages, except so far as they continue to be retained in an extremely limited list of optional studies in the colleges.

The assertion, therefore, that by proposing to depart from the principle of uniformity which has been so long permitted to govern the course of collegiate study, we are setting ourselves up in opposition to the wisdom of the educational fathers who prescribed to us this principle, is not by any means sustained by the facts of history. These venerable fathers had an object in view, and they took the most simple and obvious means to accomplish their object. They desired to make men learned in the learning of their time, and the course of study which they set before them embraced that learning, and, so far as the duration of the course would allow, embraced all of it. If we, with a vastly more extended array of subjects of knowledge before us, put the whole of them also into our course, and in view of the fact that no single individual can master the whole, propose to each learner that he shall devote himself to such as he is conscious that he can best master, we but do what we have the best reason to believe the fathers themselves would do were they in our place.

The great evil of the invariable curriculum of study in our colleges at the present time is that it makes it impossible, at least after the end of the second year of the course, to teach any subject whatever with satisfactory thoroughness. From an examination of the programme of instruction in Columbia College for the junior and senior years (I select my own college rather than another, that my remarks may not seem invidious), it appears that if every student were compelled to take every subject, and if to every subject should be given an equal proportion of the available time, no single subject, if pursued continuously, could occupy a longer period than about a month. How is it possible to expect results satisfactory either to instructor or to learner from such a state of things as this? There is no remedy for the evil but that of permitting the student to concentrate his attention upon those subjects which are most in harmony with his native bent, and to leave the others to those to whom they in turn may be more acceptable.

Notwithstanding the fact that the elective system in colleges is commonly opposed by those who argue against it for reasons professedly drawn from the philosophy of education, my conviction is that the actual reason preventing its general introduction is one which is unavowed, and is rather material than philosophical; one which is found in the fact that this system cannot be introduced into any college where the uniform curriculum has heretofore prevailed, without increasing, perhaps largely, the number of exercises which the officers are required to conduct. As a rule, therefore, the introduction of the elective system will impose the necessity of enlarging the academic staff; and as this is a thing which it is not convenient for all colleges, or perhaps even for most colleges to do, it happens that a question which is constantly discussed as one of abstract principle, is practically governed after all in its decision by considerations purely economical. It is simply not possible that the system should be introduced into all the colleges; but since it is inevitably going to be introduced into many, the probability is that out of this circumstance will grow, sooner or later, a classification of colleges into grades. Out of the higher grade, embracing the smaller number, will probably be developed the universities, if we are to have any such, which are to rival those of continental Europe. The lower will remain what they are, or will disappear.

That we are beginning to feel in this country the need of some institutions of this superior grade is a remark which it is hardly necessary to make. We profess to embrace, in the teaching of our

colleges, nearly every subject of human knowledge; but we are scarcely able to pursue any one at present beyond its elements. The majority of our students do not become so proficient in even the classical tongues as to be able to read with facility the works of classic authors which they have never read before; and yet these are subjects in which they are required to be tolerably proficient before they present themselves to the college for admission.

Two modes suggest themselves by which to meet the exigencies of the class of aspirants to knowledge, who desire some better helps than our system has yet provided. One of these is the erection of a new order of educational establishments, entirely as yet without precedent among us, in which the student shall be permitted to select his own course, and the instructors shall conduct him to the last limit of the known; institutions which are to start into existence at the legislative *fiat*, with all that completeness of organization and all that abundance of the treasures of learning which the universities of the old world have been able to secure and command through the mellow experience of centuries. Projects innumerable have been set on foot among us, looking to the accomplishment of schemes of this magnificent and costly description; but so long as the highest and most favorite and most justly popular educational institutions which we have already, continue to be painfully struggling against the difficulties which limited means entail, in spite of all the influences—political, denominational, sectional and personal—which can be combined in their favor, it is idle to expect that such projects can succeed, and it would be a manifest wrong if they could do so.

The other plan is the adoption, in our better endowed colleges, of the elective system of study, a system which permits the student who desires to pursue any given subject to a greater extent, and to attain a greater thoroughness in it than is at present practicable, to give himself up, at some period of the course, certainly while he has still some year or two, at least, before him, more uninterruptedly to this, and to relinquish other subjects in its favor. Supposing such a freedom allowed, the tone of the teaching in all the departments of the college will be necessarily raised. Along with this innovation will also naturally grow up a system of post graduate teaching and study, of which we have as yet in this country scarcely a trace, but which, with the latitude at the same time allowed to undergraduates, will assimilate the institution by degrees to those which on the continent of Europe are called universities. And this is the only way in which, if university teaching in a proper sense is ever to enter into our edu-

cational system, our American universities are to grow up. We want no universities ready-made; and if we did, we cannot get them. Neither our Congress nor our State Legislatures, nor such few lovers of learning as we have among our men of wealth, are going to pour out the millions required for the accomplishment of schemes so visionary; and which, if accomplished, would only have the effect to distract these vast sums from the more desirable work of strengthening and building up institutions which have already behind them an honorable history of substantial service rendered to the country during a long series of years. What this country now needs is that her colleges should be encouraged by solid evidences of the people's favor—that their endowments should be greatly enlarged and made adequate to that larger usefulness which we may justly look to them to exercise in the future. What the colleges need is such improvements in their plan of operations as only such liberality on the part of the public can enable them to introduce; but which, when introduced, shall enable at least some of their number to supply that deficiency in our system of superior education which we all admit to exist, and in supplying which they shall give us at length a real American university.

UNIVERSITY NECROLOGY.

VICE-CHANCELLOR ERASTUS CORNING.

Mr. CORNING was born in Norwich, Connecticut, December 14, 1794. When thirteen years of age, he was taken under the care of his uncle, Benjamin Smith, a hardware merchant of Troy, in this State, with whom he served as a clerk, and whose fortune he afterward inherited. In 1814, he came to Albany as clerk in the hardware store of John Spencer & Co., where he became a partner. On the death of Mr. Spencer, in 1824, he began in his own name the business which afterward became very extensive and lucrative, under the style of Erastus Corning & Co. His first public position was that of alderman of the city of Albany, after which he was mayor for three years. He became an officer of various railroad, canal, bank and manufacturing companies, and was repeatedly elected to the State Senate and to the National House of Representatives. He was also a member of the Peace Congress of 1861, and of the New York State Constitutional Convention of 1867. He was elected a Regent of the University February 5, 1833, and on the death of the late Gulian C. Verplanck was appointed vice-chancellor and became the senior member of the board. His counsel was always valued by his associates, and his services were especially useful as a member of the standing committee on the State Cabinet of Natural History, in which he took a deep interest. His death occurred April 8, 1872, and was the occasion of extended newspaper notices of his life and character, from one of which the following extract is taken:

"Erastus Corning entered into rest after a long period of most patient suffering, on the eighth of April. He was buried from St. Peter's church, in Albany, on the twelfth of April. The bishop of the diocese, the rector of the church, and the Rev. Mr. Shinn (in whose parish church many of the workmen of Mr. Corning's iron works worship) were the officiating clergymen.

"The plain, purple colored coffin, of the old wedge shape, with the cross upon the cover, had on it neither ornament nor flower, only a wreath of autumn and evergreen leaves, and a little bunch of ripened wheat. There was no sermon and no display, and a great man, unos-

tentatious and simple in his living and in his giving, died and was buried as he had lived. All of the clergy of the church in the city, and some from Troy, the legislature, the courts, the city officials, and the leading men of Albany, personally and officially, were present. The stores were closed, the bells tolled, the streets lined with silent mourners, and two thousand sturdy workingmen, with a sober and subdued dignity that showed the reality of their feelings, escorted the long funeral train to the grave.

"The numerous resolutions of respect, and the spontaneous outpouring of the people at the burial, showed the place which Mr. Corning held in their affections and honor. They saw in him the man of foresight and courage, of instinctive judgment, of tenacious purpose and commanding dignity; accurate in every detail of duty, strict in integrity, prompt in decision; of iron will, and of unflinching perseverance. They knew too—hundreds of poor people witnessed it with their tears—of his gracious and unostentatious generosity, of his genial interest, of his silent benefactions, of his readiness to counsel and befriend the poor. No one knows thoroughly, but God, his simple, childlike, trustful faith; the calmness with which he bore suffering and made himself ready to die; the strength of his trust in Jesus, and the ripeness of his religious life. The consolations of our most holy faith were daily and hourly with him. His last communion was within eight hours of his death, and the consciousness that lingered till the last, making keener the final agony, was blessed to be the means through which the holy words of comfort evidently and intensely 'refreshed his soul.'"

PROFESSOR SAMUEL F. B. MORSE, LL. D.

By Professor B. N. Martin, L. H. D.

Among the dead of the past year, no name can be found of higher distinction, or more widely known, than that of Professor Samuel Finley Breeze Morse. The world-wide application of his great invention, the many singular and even startling results to which it has given birth, the remarkable extension of it to intercontinental communication, the many valuable results already accomplished by means of it, and the constant suggestion of other and unlooked for uses—all these things have naturally fixed the attention of the world upon the successful author of so great a work, and made his death a subject of universal regret. In consequence of this wide-spread interest, the life and character of Professor Morse have been the theme of very general remark, in all those associations of public and

professional life which have been wont to bring him before the world.

Under these circumstances, it could hardly be necessary to bring his name before the notice of this body in those general relations already so largely discussed.

But, one important relation of his life, that in which he stands connected with our system of education, is yet untouched; and it will be appropriate that a few words should be said here of the character of Professor Morse as an educator, and of his connection with our educational institutions. It is in this light only, that I propose to offer a few remarks upon his life.

Professor Samuel F. B. Morse was born in the year 1791; a date which can scarcely be forgotten by those who take an interest in the man, from the fact that one year ago, his eightieth birthday was celebrated, in connection with the inauguration of the statue which preserves his name and aspect to posterity, in the Central Park of New York city. Educated amid highly intellectual associations, and under the influence of a father who was himself eminent for the culture of an important branch of education, geography, he early developed intellectual tastes, and enjoyed the advantages of a collegiate education at Yale. Choosing as his profession the art of painting, to which he possessed by nature some peculiar adaptations, he gave himself to the cultivation of it with enthusiasm and energy, and achieved a good degree of success and reputation.

Meantime, however, his mind was open to the impressions which the state of our country at that time awakened, in connection with the sudden influx of a large foreign population; and he became the author of a work which made him widely and favorably known to the religious thinkers of the day, and which attested his possession of considerable literary ability.

At length the discovery of magnetic electricity suggested to many persons the possibility of a system of telegraphy; and in 1832 this idea, brought to the knowledge of Morse by Professor Henry, now of the Smithsonian Institution, took a strong hold on his mind. From that time, his thoughts flowed very constantly in the channel thus opened; and he prosecuted with great resolution and patience, the investigations which were to disclose the true method of applying the novel and extraordinary discoveries which were then startling the scientific world.

It had been authoritatively announced by the scientific men of Europe, that electricity could not be conveyed to any considerable

distance. Experiments of a very accurate kind had seemingly decided that the rapid diminution of the power with every increase of distance, rendered the use of it, on a great scale, impossible.

The dissipation of this unhappy and obstructive impression was largely due to the careful observation of Professor Henry. This eminent observer showed in 1831, by experiments conducted both in this city, and in connection with the Albany Academy, in which he was at that time a professor, that the distinction between the two forms of electricity, that of intensity and that of quantity, had been overlooked by the European scientists; and that, with proper discrimination, the electrical force could be conveyed to very considerable distances. In connection with this valuable discovery of Professor Henry, Morse undertook a new series of experiments, which he subsequently prosecuted with great zeal and persistency. At about this period, he became connected with the New York University, and received the appointment of Professor of the Literature of the Arts of Design. In prosecution of the regular work of his professorship, he prepared, with the faithfulness which marked all his efforts, a careful and extended course of lectures, which he delivered for successive years to classes in the University. The art culture of that day, however, was limited, and the number of students in that department small. Some of them, I have heard speak with much interest and approval of Professor Morse's lectures; and a considerable part of the improved culture of more recent days, is due to the growth of the germ of instruction which he then planted in some of the best of our art students.

Gradually, however, his interest in art diminished before the growing enthusiasm which the new project of the telegraph awakened within him; and at length his thoughts became greatly absorbed in his prospective invention. Everything was then crude and dim, and a large field of experiment lay before him,—a tangled wild, through which he was, with laborious care, to make his way. He provided himself with some apparatus, of a very simple and homely sort, I am told, and occupied himself with the more exact determination of facts for the practical application of the electrical phenomena to telegraphic use.

Professor Morse at that time resided in the University building, and was accustomed to stretch his wires around the walls of his room, and through the ample halls of the edifice, which afforded scope for quite a length of circuit. Later, he ascended to the roof, and, stretching his wires around the ample space there open to him,

determined that a considerable length of wire interposed no serious obstacle to the transmission of the galvanic current.

In these experiments, he derived great aid from his connection with the University. The professor of chemistry, then as now, was the eminent Dr. John W. Draper; who, as it happened, was at that time engaged in writing upon electrical subjects. The labors and experiments which attended the preparation of Dr. Draper's work, Professor Morse witnessed with great interest. The laboratory of the Institution, in which Dr. Draper was experimenting, was a favorite place of resort with Morse; and often, in the evenings, he would come down from his lonely room in the upper story, and discuss and consult with Draper, till midnight. These discussions placed Morse in possession of all that was at that time known on the subject; and enabled him to give a more exact and definite character to his own investigations.

When the general facts had been sufficiently determined, it became important to decide by actual trial, whether the force of galvanic electricity could be conveyed in sufficient amount for practical use, through a long circuit of wire. For this purpose Professors Morse and Draper visited a rope-walk in Manhattanville, with eighty rolls of wire of two miles each, making 160 miles of wire, and forming, as was then deemed necessary, a forward and backward circuit of eighty miles. For this distance, the force was found to be practically available; and these experiments, which were numerous and varied, determined the absolute possibility of distant transmission. From that time, the telegraph was, to his earnest and believing mind, a reality.

It was not, however, till the year 1843, that it became such to the less instructed minds of others. Amid many jeers, and against great objection, the inventor obtained a grant from Congress, of some $30,000, with which to test the practicability of the invention, the priceless value of which he continued to press upon the country. The test was, at first, unsuccessful. The wires were laid in leaden tubes, in which the unoccupied space was filled up with pitch; but the insulation was imperfect, and the plan would not work. The inventor, however, was not discouraged. He again went to work, and adopting the simpler but apparently more exposed method of attaching them to poles, achieved the success by which his name will be forever distinguished in the annals of social progress.

The history of the subsequent improvement and ultimate perfection of the invention, has been elsewhere written; and it is needless

to recount it here. The expansion of the telegraph over the broad area of the country, and of the continent; its extension over the continent of Europe, its remoter reach across the Asiatic continent, through the Russian possessions, and its final triumph in the complete establishment of intercontinental communication across the deep sea, these were achievements which it was the unusual good fortune of the inventor to live to witness. It was his happiness too, to transmit the first oceanic despatch; and still later, to receive on the anniversary occasion above referred to, the congratulations of the telegraphic operators in all the civilized world.

Professor Morse was eminent for his profoundly religious idea of life, and for his earnest wish to promote religious interests. He was the founder of a lectureship in the Union Theological Seminary "On the relations of the Bible to the sciences," from which the friends of sound views may hope long to gather valuable and varied fruits.

He had a high appreciation, moreover, of education in all its aspects. A short time before his death he established a foundation for a department of art instruction in Rutgers Female College; and his will appropriated the sum of $1,000 for an annual prize medal in the University with which he had formerly been connected.

He passed away, April 2, 1872, in the ripeness of his age, with faculties undimmed, and with his Christian hopes clear and strong. He looked back, to a life of usefulness, and an old age of honor and peace; and forward, to a union with the Redeemer whom he had loved through life, and who in death was his only and all-sufficient trust.

PRESIDENT GEORGE W. EATON.

GEORGE W. EATON, D. D., LL. D., late president of Madison University and Hamilton Theological Seminary, in the State of New York, was born near Huntington, Pennsylvania, July 3, 1804. In 1805, his family removed to Ohio, where he was afterward prepared for college, and in 1822, matriculated at the Ohio University.

Having remained at the university two years, the circumstances of his father rendered it necessary for him to relinquish his college course for a time, that he might procure funds for its completion. With this object in view he spent two years teaching in Prince Edward county, Virginia, at the end of which time he made, principally on foot, a tour of the seaboard States, as far north as Massachusetts, spending some time at Princeton, New Jersey, and at Andover, Massachusetts, and then, in 1827, entered the junior class

of Union College, at Schenectady, New York, where, under the presidency of the late noted Eliphalet Nott, D. D., LL. D., in 1829, Mr. Eaton was graduated with the highest honors of his class.

In college, he was associated with men who have since risen to places of the highest eminence in civil life. Among his college associates he was highly esteemed for his unselfish disposition, his keen sense of honor, and his generous bearing toward those whose scholarship and college honors did not equal his own.

Having won the personal regard of President Nott, he was, immediately upon his graduation, elected a fellow and appointed a tutor in the college. In this position he remained one year, and then, in 1830, much against the wishes of the president, who, long years after, spoke of the circumstance with regret, he left the college and became principal of Union Academy, at Belleville, Jefferson county.

Having been elected to the chair of ancient languages in Georgetown College, Kentucky, in 1831, he removed to Georgetown, where he remained, during the latter part of the time acting as president, until 1833, when he was called to the professorship of mathematics and natural philosophy, in what was then known as Hamilton Literary and Theological Institution, located at Hamilton, New York, a school which had for its chief object the training of young men designed for the ministry in the Baptist denomination. This institution was, in 1846, chartered as Madison University, and by this action the theological seminary became so separated from the college that, though they occupied the same buildings, and some members of the theological faculty gave instruction also in the college, yet the former was controlled by the New York Baptist Educational Society, and the latter became subject to the Board of Regents of the University of the State. Professor Eaton remained in the chair of mathematics and natural philosophy for four years, and at the end of that time, in 1837, was elected to that of ecclesiastical history in the theological school. In 1844, he received the honorary degree of Doctor of Divinity from his alma mater, and in 1850 was elected professor of systematic theology. In 1856 he was elected to succeed Stephen W. Taylor, LL. D., deceased, as president of the university, still retaining his professorship of theology in the seminary. For twelve years he performed the double duty; as president, giving instruction in intellectual and moral philosophy, at the same time continuing his lectures in theology, until 1861, when he exchanged systematic theology for homiletics.

These arduous labors were unremitted except in the years 1863

and 1864, when, his strength giving way, he sought relief in a European tour, during which he labored earnestly and efficiently to give a true idea of the nature of the conflict then raging in our country. In this tour he formed the acquaintance and secured the personal friendship of many of the most prominent men of Great Britain and the continent, among whom were Cæsar Malan, Merle D'Aubigné, John Bright, Goldwin Smith, Professor Farrar and Dr. McCosh.

In 1868, his physical powers having been so severely taxed for years, he sought relief from a portion of his responsibilities, and therefore resigned the presidency of the university, retaining simply that of the theological seminary, to which he had been elected several years before. Thenceforth, he gave instructions only in homiletics, until, in 1871, he was forced to cease from all active labor. He died on the 3d of August, 1872.

Without attempting to give a full analysis of Dr. Eaton's character, it may be said that physically, intellectually and morally, he was colossal. In his moral nature, love was the reigning element. It predominated everywhere and became a living force. It pervaded every sphere in which he moved. He loved everything good, and even the bad seemed often so covered with his charity that he was slow to see it, slow to hate it. This love would sometimes blind him and make him a victim to the designing. Unsuspicious, he thought other men were governed by the same sentiment that ruled him. "The adder in the pathway would strike at his heel, and the archers sorely wounded him." But when he saw anything mean or trickish, malicious or unjust, he had great contempt, and the scorn and sarcasm with which he visited it were withering.

He was in love with nature, and drew inspiration from the thousand sources of beauty, sublimity and design which are here opened to view. No man could be more in harmony with the outward world. He was in love with God, and communed with him as with an ever-present and sustaining spirit. He was in love with the Gospel, and overwhelmed, at times, with the wisdom and power in it to save man. Skepticism and doubt at this point found with him no lodgment. To this was owing that simple and hearty assent to every declaration in the inspired Word as the end of all dispute; to this was owing that purely evangelical spirit which permeated all his teachings and made his broad and comprehensive views of Gospel truth such a power in the hearts of his pupils. He could say nothing, he could teach nothing that could weaken the foundation of Christian faith. He sought

more to inspire the soul than the intellect, and used often to say that a large intellect without an evangelical heart was a miserable failure in the ministry. It is needless to tell how widely in him love reached. There was no corner in his life which it did not quicken.

He loved, as if an only child, the institution which he served. He loved its spirit and surroundings—he loved the sky above it, the landscape below it, the hills around it—he loved the pious dead that sleep near it. It was this love that made his soul revolt at any proposed violence or infringement on local rights. It touched down into the quick of his nature and aroused indignation.

His intellect, though not compact, was majestic. He was not marked for tact or sagacity or organizing power or generalship: but when he saw clearly an end and the way to reach it, his power was irresistible, for it marshaled his whole nature, and when thus marshaled he was not fearful, but bold and aggressive in executing. He summarily removed obstacles or crushed his way through all opposition. He used no craft, took no advantage except the advantage of force, and delivered his blows straight from the shoulder. His assailant would cower and retire from the contest. There was a majesty, mingled with awe, in his whole mien, when thrown, by some wanton attack, on the defense of truth, or virtue, or right; for he stood a massive frame, rounded out into large dimensions, a singularly winning countenance, with steady eye, and all aglow with earnest emotion and unyielding conviction.

As in his moral nature love swayed, in his intellectual the imagination was prominent. It did not eclipse his judgment, or reason, or conscience, or memory, but it threw its scintillations over all. It kindled an enthusiasm which surrounded him like the fire in Moses' bush, burning, but not consuming. It glowed through his whole soul, and crowned with a halo of light all his intellections. Hence, his power of description was masterly, whether in extemporaneous or written discourse, whether in the social circle or before his class. A scene which he had once looked on, or a landscape that he had viewed, he could reproduce with an accuracy of detail and a fullness that is rarely equaled. His pictures of Paris, his views of Switzerland, and his delineations of some of the distinguished men of England, as seen in his European tour, and many other topics introduced into his lectures and preaching, are in point as illustrations of his happy power of description. So easily was his mind impressed, so retentive, so readily again did it throw off the impressions in the most elegant and appropriate diction, that he became a mirror of

nature, and a living panorama of scenes and transactions in which he had mingled. His power of reproduction equaled his power of description, and past scenes became in his hands a new present.

With such a great and loving heart and massive intellect, kindled up with a chaste and vivid imagination, it is not difficult to see, as the resultant, the type of character illustrated in the person and life of Dr. Eaton. He was simple in his manners, great in his simplicity, genial, rich in his experience, wide of observation, varied in his learning, broad and comprehensive in his views, versatile, eloquent. Above all, and pervading his entire moral and intellectual nature, the religious element predominated. It toned his conversation, his instructions, his preaching, and his public lectures. In all things, Christ was his pattern. His hope was large and full of immortality, and having full faith in the divine efficacy of the Gospel, he inspired the pious young men who came under his instruction with true Christian philanthropy and missionary zeal.

It is proper here to speak of Dr. Eaton as a teacher—an educator. While as a writer he was perspicuous, classical, and glowing; while as an orator he was elevated, fervid, and eloquent; while as a preacher he was catholic, tender, and convincing; while in the command of fit expression he had no superior and but few equals; yet it is as an educator that he deserves here to be spoken of; and justice demands a careful pen. Perhaps his first and most prominent characteristic as a teacher was the enthusiasm with which he entered every department of instruction to which he was called. It was his first business to make himself thoroughly familiar with the whole field of investigation, and he rested not until he had examined every cognate question—encompassed all that could be regarded as valuable in the literature of the subject.

He could never rest while there was another author unread and unweighed. The insatiate thirst for knowledge with which he began never left him through the whole forty-two years during which he occupied the position of teacher; and even after retirement from active duty, he still seemed as anxious, as zealous, for new truth, as unremitting in his investigations and readings, as when he first began his splendid career. Though he occupied so many different chairs, and had occasion to pursue so many different courses of study, he yet seemed as much at home in any one of them as though that had been the one department to which he had given his life.

Another characteristic of the teacher was the enthusiasm which he carried into the class-room and infused into his pupils. When

he taught mathematics, the mathematical spirit seemed to pervade the school. Other professors sometimes complained that the attention of the students was given too exclusively to mathematics. When he taught history, then history seemed to be the prominent subject, and historical themes would be presented on public occasions. And when he taught metaphysics it was the same thing again; questions in metaphysical science from Kant, Cousin, Reid, Hamilton, and McCosh, came in for discussion, criticism, or approval. In theology, he adhered to the milder type of the Calvinistic system; and as he unfolded to his classes the, to him, glorious and blessed doctrines of sin, redemption, atonement, and intercession, his whole soul seemed infused into the subject, the tear would often stand in his eye, and, rising from his chair, he would pour himself out in a flood of extemporaneous eloquence, which sent thrills of delight as well as of admiration through the hearts of his pupils. The memory of "the doctor's" lectures and gushes of eloquence lives in the hearts of hundreds of his pupils, as affording some of the highest pleasures of their lives.

In his teachings, he was at the furthest remove from dogmatism. Every point had to be carefully presented, with all the pros and cons, and then the conclusion was drawn from the whole. It was his delight to set his pupils to investigations on their own account, and they seldom left the lecture-rooms without being sent to the libraries to examine some author, with instructions to bring the results of their investigations for consideration at a future day. The consequence of all this was that very few of his pupils ever found occasion to differ with him. He treated their opinions and objections so courteously, and presented the rebutting arguments so kindly, that he disarmed opposition before it had arisen, and the objector felt that his points were fairly met and completely demolished.

Finally, we would mention, as further characteristic of the man, the strong personal attachment formed by the pupil for the teacher, and so warmly reciprocated on his part. It is probable that no man ever spent any considerable time under his instruction without becoming thus bound to him by ties of affection. His appreciation of what was meritorious in the effort of the pupil, and his criticism, so kind and so just, caused him who had most to bear to feel that he was honored by the strictures of his teacher; and then the sympathy with which he opened his heart to the trials and hardships of those who were contending with poverty, his efforts at assistance where it was within his power, made the most desponding hopeful and the

weakest strong. So deep and reliable was this personal attachment, that his government of the college was hardly known as such. He ruled by love, and so seldom had occasion to resort to other measures that some even thought that "discipline" was a nullity, and yet, during his presidency, he accomplished some of the most difficult feats of discipline which are known to college presidents. What has often shaken other colleges to their very centers and even sent away whole classes, was by him accomplished so quietly that some ha ly knew that trouble existed. And it was because of the respect and love of the students, who would not wound the feelings of their president.

It was always counted among the felicities of the alumni of Madison University that they were permitted to experience "a shake of the doctor's hand." His memory will be blessed as long as one of them survives to tell of his love for his old teacher.

His remains lie in the college cemetery, in a spot overlooking the scenes of his life-work and the landscape which he ever regarded with the fondest delight.

PROFESSOR EDWARD WALSTEIN ROOT.

EDWARD WALSTEIN ROOT, the second son of Dr. Oren Root, was born in the building now occupied by the cabinet of Hamilton College, July 4, 1841. The place of his birth would have suggested a correct foreshadowing of his tastes, habits and favorite pursuits. He was always fond of the beautiful in nature, in art and in literature. He grew up among surroundings that quickened his native passion for knowing all that can be known about flowers, and trees, and minerals, and the phenomena of nature. Sensitive and delicate in his physique, he had no liking for rude and noisy sports. While others of his age were engaged in boisterous mirth, he found quiet enjoyment in his father's garden or cabinet, or in the society of books and bookish companions. He could not remember the time when the names of the more common minerals were not known to him. One of the triumphs of his boyhood was to master the pronunciation of names that were unusual and difficult. Thus by facilities furnished at home and in the college, he was early initiated into those beautiful and fascinating studies to which his brief life was devoted.

He made his preparation for college with the late Henry P. Bristol, while that most excellent teacher was principal of the grammar school. In college he was a favorite companion, always a diligent

student, and successful in whatever he undertook. His preference for scientific and belles lettres studies was pronounced, and fruitful of results that are well remembered by his classmates and teachers. He made himself familiar with the history of English literature. He exhibited a skill in literary criticism and a maturity of judgment in matters of taste and expression that was remarkable for one of his years. His Clark Prize Oration on "The Earliest and the Latest Poet Laureate," was a brilliant and admirable effort.

In all class rivalries, which so severely test the finer qualities in youthful character, he revealed a noble elevation of spirit, a contempt for all unworthy self-seeking, and a sincere regard for whatsoever things are honorable and chivalrous, and of good report. In expressing opinions, while always courteous to others, he early revealed a certain positiveness of character which resulted from his own clearness of insight, his good sense and honesty of purpose. He was frank and fearless in speaking of men and measures, because he was unselfish, and free from guile, and loyal to the truth. He was cheerful and contented in his nature, and worked with serenity in obedience to his convictions of duty and propriety.

During the year following his graduation in July, 1862, Mr. Root remained in Clinton, giving a part of his time to chemistry, under the direction of Dr. Avery, and a part of it to the study of modern languages. In the summer of 1863 he sailed for Germany, in company with Dr. C. H. F. Peters, of the Litchfield Observatory, and at the University of Berlin, under the direction of Professor Heinrich Rose, he found the best facilities for enlarging and perfecting his attainments in chemistry and kindred sciences. In a few months he had so extended his knowledge of the German language that he could listen with interest and profit to the lectures of German professors. While thoroughly devoted to technical chemistry, he lost no favorable opportunity to make himself acquainted with the agriculture, politics, social customs, literature and art of the German people. His social aptitudes and gifts drew him into relations of sympathy and friendship with some of the best minds in Berlin and Heidelburg.

At the University of Heidelburg, where he passed the second year of his residence in Germany, he enjoyed not only the instruction but the personal friendship of Professor Bunsen. His letters from Germany, though not written for the public, found their way into various periodicals, including the New York Horticulturist, and were delightful as well as profitable reading. His descriptions of scenery

were especially vivid and enjoyable. Whatever he saw left a clear record in his memory, and was faithfully reproduced in his sentences.

On his return from Germany, in 1865, Professor Root was immediately honored with an appointment in the Columbia College School of Mines, as Assistant Professor of Analytical Chemistry. This election was made at the suggestion of Professor Charles F. Chandler, Dean of the Faculty, who had been in correspondence with Professor Root, and knew how well he was fitted for that post. Here he found ample scope for his exact and various attainments in science. Here his thorough methods of instruction were patiently and successfully applied. Here his plans were laid for continued study and new achievements. Here he prepared articles that were published in *Silliman's Journal* and other scientific periodicals. Here he completed his preparation for the larger duties of a more responsible position.

In July, 1868, the trustees of Hamilton College were called upon to make their first appointment to the Chair of Agricultural Chemistry, which had been recently endowed by a liberal bequest from Silas D. Childs, of Utica. Among the alumni and friends of Hamilton College, Professor Root was well known as a successful teacher of science, and was held in high esteem for his literary attainments, his integrity of character, social worth and tested ability. His election to the Childs' professorship, as its first incumbent, gave promise that the good purpose of the bequest would be successfully realized. His first course of lectures on Agricultural Chemistry was delivered to the class of 1869. In July of that year, Dr. Avery retired from the Chair of General Chemistry, which he had occupied for thirty-five years, and Professor Root was elected as his successor.

In August, 1869, Professor Root attended the Chicago meeting of the American Association for the Advancement of Science. While in Chicago he was seized with serious illness. Before he had fully recovered, a visit to the home of his brother, Professor Oren Root, Jr., of the University of Missouri, involved exposure, and was followed by prostration and continued weakness. But his will was resolute and unbending. He returned to his work in college. He carried the heavy burden of daily toil with fidelity and heroic enthusiasm. In the autumn of that year, the laboratory of the college was remodeled under his direction, and furnished with the best facilities for instruction in chemistry. He gave lectures to the class of 1870, and received from them resolutions expressing their entire satisfaction and their high respect for him as a faithful and skilled instructor.

The examination of the senior class in chemistry in the spring of 1870, was for him a professional triumph, gracefully won in spite of wasting disease and physical weakness. During all these months of struggle with relentless disease, he exhibited a power of will and of patient endurance that are not often united with so much of gentleness and almost feminine refinement and delicacy of taste.

After parting with the seniors in June, 1870, he decided to try the effect of another voyage to Europe, this time in company with his younger brother, Elihu Root, Esq., of New York.

There was great pleasure in revisiting friends and familiar scenes in Germany. It was something to witness the grand enthusiasm which electrified and united the Germans at the outbreak of their war with France. But there was no real gaining of strength or of hope. While his interest in favorite studies was undiminished, he became conscious that his small remainder of strength was lessening each day. He wanted to revisit Heidelburg, but military obstacles were in the way. Turning southward to the brilliant capital of Austria, he returned through Munich to Geneva and Paris. Each change of place brought a stronger yearning for the endearments and comfort of home. And so in the following September, after a trying and tedious voyage, he again found himself amid the familiar scenes of his childhood, where he could hear the voices that were dearest. He felt that his end was near. He prepared for this religiously and temporally, with the same self-possession and serenity of soul that had marked his preparations for a lecture or a voyage to Europe. His worldly affairs were all arranged, and his worldly goods were disposed of. He had been habitually reticent in matters of religious faith; but his life had been blameless, he had carefully improved his Sabbath privileges, and reverently acknowledged in the presence of his last enemy, that his faith and trust were fixed on Christ.

On the 15th of November, 1870, Professor Root quietly breathed his last. On Thursday, November seventeenth, there was a large gathering of friends and students in the college chapel to express their sorrow for the loss of a dear companion and teacher. The draping of the chapel was in keeping with the dark sense of bereavement that oppressed all hearts. Dr. Gardner read passages of scripture appropriate to the occasion. He was followed with an address by President Brown, whose tender and beautiful tribute to the memory of the departed we have fully used in this obituary sketch. Dr. Upson also spoke briefly and with deepest feeling. It was Dr.

Upson's first return to the college after the beginning of his pastoral work in Albany. He came back to speak words of sorrow at the grave of one who was as dear to him as a brother. There was a mournful procession from the chapel to the hillside cemetery, and the mortal remains of Professor Root were carried to their final rest near the graves of his kindred and of others who have done good service for the college.

In some particulars the character of Professor Root was unique, and not to be illustrated by comparing him as a teacher and a man with his predecessors who sleep in the same cemetery. Yet it may be truthfully said that his life and character were adorned and ennobled by something of Azel Backus' warmth of sympathy, something of Henry Davis' strength of will and tenacity of purpose, something of Seth Norton's courtesy and critical acumen, something of Josiah Noyes' enthusiasm for science and rural studies, something of Finley Smith's refinement and literary culture, something of Marcus Catlin's serenity of spirit and pureness of life.

TRUSTEE WILLIAM KELLY.

This eminent citizen, born in New York city in 1807, and during his early manhood a successful merchant, retired in 1842, with an ample fortune, to the estate known as Ellerslie, at Rhinebeck on the Hudson; not, however, to spend the remainder of his life in ignoble ease, but to become actively engaged in such avocations as would benefit and enlighten his fellow-men. For several years he was President of the State Agricultural Society, and on his own estate of a thousand acres, practically illustrated the best modes of cultivating the soil and rendering rural pursuits alike profitable and attractive. Reared, as he had been, in a family noted for culture and refinement, he took a deep interest in the cause of education, in all of its departments. He was President of the Board of Trustees of the University of Rochester, of the Vassar College, and of the National Baptist Educational Commission. He was also engaged in the movement to establish a State Agricultural College, at Ovid, and was one of the original trustees of Cornell University. To these and other philanthropic enterprises he generously gave not merely his name and influence, but much earnest work and a liberal share of his income. He did much to improve the character of common schools in his vicinity, by furnishing plans for commodious and tasteful school-houses, selecting pleasant and appropriate sites for them, aiding in their erection and in planting the grounds around them,

visiting the schools, encouraging the teachers, and instituting rewards for the scholars. In the nearest school (in which he served as trustee, librarian and treasurer), not only was this system kept up, but every reward at the close of the term must bear the autograph "William Kelly," or it was of little value in the estimation of the children. Providence seemed to deny him children of his own, that he might bestow his affection upon those of other people. He arranged a beautiful grove near the river, with every convenience for the entertainment of the little folks, who, with their parents and friends, flocked thither by thousands during the summer months of each year. As his reward for all this kindness, he had the satisfaction of being universally beloved, and of observing that, under these educating and refining influences, no acts of vandalism were committed on his premises during all the years in which these summer visits were allowed.

In 1870, Mr. Kelly's health became seriously impaired, and in November, 1871, he sailed for England, taking up his residence at Torquay, in Devonshire, in the hope of ultimate recovery. A cold, however, contracted in London, developed into an acute disease which caused his death, on the 14th day of January, 1872.

His remains were brought to New York for interment, and an impressive funeral service was held in that city, on the 25th day of April. An extended and appropriate "Memorial" of Mr. Kelly, prepared at the request of the State Agricultural Society, by Gen. Marsena R. Patrick, was presented at the annual meeting in January, 1873, and has been used in preparing the foregoing sketch.

THE METRIC SYSTEM OF WEIGHTS AND MEASURES.

BY CHARLES DAVIES, LL. D.
Chairman of the Convocation Committee on Coins, Weights and Measures.

The committee on coins, weights and measures, to whom was referred the address of F. A. P. Barnard, President of Columbia College, delivered before the Convocation at its last annual meeting, have carefully considered that valuable paper. They deem it fortunate that the ablest advocate of the early and general introduction of the metric system has placed upon the records of the Convocation all the arguments in its favor So grave a question should be analyzed by many minds; for all the lights of knowledge and all the results of experience are necessary to its right solution. Under these convictions, the committee have re-examined the whole subject. They have compared, carefully, this able paper with their former report; and they have sought to do this duty, free from the influence of previous opinions.

PRESENT STATE OF THE QUESTION.

The committee appended to their former report, adopted by the Convocation at its session in 1870, the law of Congress, passed in 1866, which legalized the use of the metric system in the United States. The system, therefore, has had a legal existence in the country since that date.

The second section of the bill fixed, by a series of tables, the exact equivalents of all the weights and measures of the present system, in terms of the metric system; so that both systems have now the same legal existence, and every unit of the one has its exact or proximate value expressed in a corresponding unit of the other.

That law also provides that the metric system may be used in all contracts, in all dealings, and in all pleadings in courts; hence the two systems are now equally open to the common use of all; and, without further legislation, that one will be ultimately preferred and adopted which, in its various uses, affords the greatest advantages.

WHAT IS ASKED BY THE ADVOCATES OF THE METRIC SYSTEM.

The two systems having been placed by legislation on a perfect equality, it would seem but just to a practical and sagacious people to leave to their own experience and wisdom the use of either or both of them, as might best suit their convenience. But the friends of the metric system have discovered that its permissive use will not insure its general adoption; that its great theoretical advantages seem to disappear in its practical uses, and that it can make no progress without the aid of compulsory legislation. Wherever it has been introduced, the exclusion of every other system, by penal enactments, has been found necessary. The friends of the metric system are here to-day to give such direction to the sentiments and opinions of this Convocation as shall lead ultimately to that result. Your committee, therefore, understand the question under consideration to be simply this:

"Shall the metric system of weights and measures be adopted in this country by compulsory legislation, and the use of every other system forbidden?"

The committee, in their report, which was adopted unanimously by the Convocation at its session in 1870, considered, very fully, the general relations of the metric system to our own, now in use. As supplementary to that report, they now propose to point out the derangements which the introduction of the metric system would produce in the mechanic arts — in the labor of the country and in the knowledge of the masses, which, beginning in the nursery, is enlarged by daily observation and experience, and is, perhaps, greater in amount than all the information derived from books.

EFFECTS IN THE MECHANIC ARTS.

This view of the subject has already been partially taken by Mr. Stevenson, a distinguished member of the British Parliament, in a speech in July, 1871, which, doubtless, contributed largely to the rejection of a bill, by the House of Commons, for the compulsory use of the metric system. Mr. Stevenson says: "I would desire to treat this question from a practical point of view, and I believe that no one can have more experience than myself, as a manufacturing chemist, in those calculations and measurements which are alleged to be capable of simplification by the introduction of the metric system. It is asserted that the relation between the measures of weight and of capacity, in that system, is direct and simple, and so it is. And we are told that we cannot get this advantage unless we aban-

don our own units of weight and measure, and start afresh with metric units. This is quite incorrect. In my business, the units, one pound and one cubic foot, are constantly used, and are the bases of all our plans and arrangements. In the large leaden chambers, used for the manufacture of sulphuric acid, we provide so many cubic feet of capacity for every pound weight of sulphur burned in twenty-four hours; we can weigh and measure the sulphur and sulphurous gas respectively, in the solid and gaseous state, and afterward determine the quantity of sulphur in the form of liquid sulphuric acid, and there is no difficulty whatever in making such calculations by means of the present units. For instance, we make several hundreds of calculations every week of the quantities of sulphuric acid manufactured and consumed, which is done by gauging the depths of cisterns of known dimensions, and observing the specific gravity of the acid. These cisterns are, as far as possible, constructed so that every inch, or one-tenth of an inch in depth, corresponds to one or ten cubic feet. Then as one cubic foot of water weighs 1,000 ounces, if the acid be of the right specific gravity of 1,600, the weight of a cubic foot of it is 1,600 ounces or 100 lbs.; and multiplying this by the depth, we get the weight of the contents of the cistern in pounds just as easily as a French manufacturer could get a similar result in kilogrammes. No doubt the Frenchman can turn his kilogrammes into his tons more easily than I can, for he divides by 1,000 and I divide by 2,240. And I find no difficulty in keeping our accounts in tons, and the decimals of a ton; and all the statistics of the manufactory are rendered in the same way. And I venture, as far as my experience goes, to contradict the statement of the report of the Standards Commission, that the want of the metric system is not 'unfrequently felt by chemists and engineers of the highest class.' All that they can possibly want can be accomplished by the decimalization of our existing standards, which they can do for themselves, for these are the very classes to whom arithmetical calculations present the smallest difficulty.

"I have made a calculation, that in one manufactory with which I am connected there are weekly upwards of 20,000 separate weighings of fuel, raw material and materials in different stages of manufacture, including about 700 packages of finished product. Only a part of these packages is exported to countries where the metric system prevails; and yet we are called upon by the advocates of the metric system to overturn all these weights for the greater convenience of trade with those countries. Again, the packages I speak of are

casks, of which the sizes are expressed in inches of height and diameter — the staves in fractions of an inch in thickness, purchased at a price for every 1,000 superficial feet, and the cooper who makes them knows what size of cask is required to hold so many pounds weight. But he is now asked to learn a new language, and to bewilder himself with metres and centimetres and kilogrammes."

"A sawyer has a very clear idea of what is meant by cutting a twelve-inch log into half inch boards; but what notion would be presented to his mind by calling the log thirty centimetres and five millimetres, and the thickness of the boards one centimetre and twenty-seven millimetres? A carpenter has a very clear notion of the size and shape of a joist nine inches by three. But he would fail to recognize these familiar dimensions, translated into the new language of 22.86 by 7.62 centimetres. A plumber, who clearly apprehends what is meant by a sheet of lead, five lbs. to the square foot, would be baffled by the thickness being described as 2.26 kilogrames to 9.29 square decimetres." * * * * * * * *

"There is a point, in connection with this question, to which I cannot find that any allusion has been made, which, though not immediately arising from the proposed change of the law, would be a necessary consequence of it, and must produce a degree of confusion and loss that no one seems to have contemplated. Suppose you had passed this bill and it had come into operation, and you had dragooned the people into submission to it, and succeeded in sweeping every pound and ounce weight and every yard measure from all the counters and market-stalls in the kingdom, have you even then abolished feet and inches and pounds weight? So far the law would be satisfied; but you would be still far short of your purpose, for there would remain an indefinitely long period of transition and confusion. There are countless manufacturers that turn out articles of definite sizes and definite weights, and these weights and sizes are part of the name of the article. The simplest illustration of what I mean is such a case as that of candles, the moulds of which are made so as to turn out sizes of four or six or eight to the pound. These sizes would be quite incommensurable with similar numbers of candles to a kilogramme; and if the phrase "six to the pound" were to become illegal under the bill, I am at a loss to know what the candle maker would have to do, and what word a housewife would employ to express her accustomed size of candle, and how she is to know if her six candles weigh a pound when the pound weight is illegal and unknown."

"I have beside me a large collection of price lists, and it is appalling to see what confusion would be introduced into all dealings with the articles named, by their becoming unrecognizable under the new names of the metric system. Here is illustrated a sheet of hinges—of many various sizes—and all these sizes are expressed in inches, and halves, quarters and eighths of an inch. Are such names as '2½ inch hinges' to be illegal under this bill, and to vanish from the English workshops? If so, how will a workman recognize the size he has been accustomed to when he wants to buy some more of them; and if not so, then what becomes of the boasted simplicity of a single system for the whole world, when even in our own country we shall be only burthening our thoughts and language with a new one in addition to the old and well understood system."

"A hardware merchant's price list would furnish me with endless instances of the way in which the present units of size enter into the names and classification of articles of trade. Screws and bolts, used in millions, are all made to the common fractions of an inch, not decimal. Workmen's tools, such as chisels, augers, etc., are known by inches and the fractions of an inch—sizes wholly incommensurable with metrical numbers. Are we to give up making and using half inch, three-quarter inch, or inch diameter gas-pipes, with all the taps and couplings and reducing joints, made to fit those sizes?"

"I have in my hand a price list of a dealer in soft goods, and there, too, I find that in numerous instances feet and inches are used as a part of the essence of the names. In the Manchester yarn market, the great staple quoted is 40's. What is this? It is a yarn spun of such a thickness that forty hanks, measuring each 840 yards, weigh one pound. What is this to be called, when pounds and yards are abolished? Again, the fineness of cloth is expressed by saying 16 by 16. That is, these figures represent the number of threads of the warp and weft running each way in a square of a quarter of an English inch, and this notation is understood in all the continental markets. Every Indian commercial telegram quotes seven pounds and eight and a quarter pounds sheetings, referring to and defining the cloth of which these weights contain so many yards. Must Manchester find, in the metric notation, some complex equivalents for these simple and convenient numbers?"

"I should only weary the House were I to enumerate many more cases, in which it would be extremely costly and inconvenient, if even possible, to alter the sizes of articles based upon the present units. Does any one expect that ironmakers are to give up rolling

one-inch bar iron, and all the endless sizes and shapes of bars founded on inches? Is three-fourths-inch boiler plate no longer to be known in the trade, or is it be known only in some long decimal of metric terms? Are all our gasmeters, which register cubic feet, to be destroyed and replaced with metrical ones, and the prices of gas to be readjusted to the cubic meter? After the passage of the bill, is it to be illegal for the National Rifle Association to offer prizes at Wimbledon for the best shooting at 1,000 yards? And are all our rifles to be resighted, and the fuses of shells to be graduated at Woolwich in millimetres, instead of tenths of an inch? Are all the mile-stones on our highways to be shifted, and parliamentary trains, at one penny a mile, no longer to be spoken of?"

The committee have quoted largely from the speech of Mr. Stevenson, because he is both a legislator and a manufacturer, and has seen, face to face, the difficulties in making radical changes in a system of weights and measures to which a people have been long accustomed. Every word he has uttered is equally applicable to the changes proposed in this country. The committee will present a few examples from our own workshops, illustrative of what he has said.

Butts and Hinges.

The committee addressed a letter to the Scovill Manufacturing Company, at Waterbury, Connecticut, asking for the price list of butts and hinges made in their establishment.

There are, on this list, 155 different sizes of butts and hinges, all the dimensions of which are expressed in inches and the fractions of an inch — the fractions used being one-half, one-fourth and one-eighth. The inch, and the fractional units, one-half, one-fourth and one-eighth, are the four simple elements of that comprehensive language which pictures to the workmen the exact size and dimensions of every hinge and butt, and also the relations of each part to all the others. If we change the unit one inch to the meter, with its decimal divisions, what will follow? The inch has no exact equivalent in the new system of numbers. The dimension nearest to it is the centimeter, equal to four-tenths of the inch, very nearly. Three of these parts exceed the inch by about two-tenths. Now, give to the master workman of this factory the meter, with its decimal divisions, and note the result. Not a single hinge, or butt, or pattern, or piece of machinery in the entire shop will be commensurable with the new unit, and therefore can only be measured by it, approximatively. Hence, in the new numbers the parts of the butt and hinge are not

commensurable with each other, and the same is true for all the moulds and the machinery. The change, therefore, of the unit of length in this establishment would carry with it the necessity of changing the dimensions of every hinge and butt, and of every piece of machinery with which they are fabricated, for all acknowledge the necessity of exact relations between the standard and all the parts which it measures. Therefore, when we change the unit of measure and the scale of numbers, we necessarily change the *things themselves.* The language is also changed. Its elements are no longer the simple units, one inch, one-half, one-quarter and one-eighth, but become complex decimals of the meter, which is said to be the one ten-millionth part of the distance from the equator to the pole.

Steam Engine.

The committee obtained from the superintendent of the Fishkill Landing Machine Works a working plan of a steam engine of twenty-five horse-power, with many of the dimensions marked thereon. It lies on the table, and the committee hope that every member of the Convocation will examine it, before voting on the acceptance or rejection of this report. This working plan is accompanied by a statement of the superintendent, setting forth the whole number of parts of the machine, and also the number of different parts. There are, it seems, 468 parts in all, and 147 different parts. He has also given the number of dimensions of a single part, which he regards as a fair average of the whole. There are, in the part so selected, twenty dimensions, nine of which are expressed in terms of the inch, and eleven in terms of the inch and its fractions. In the 147 different parts of the engine there are, therefore, 2,940 different dimensions, 1,329 of which are expressed in exact inches, and 1,617 in inches and the fractions of an inch, the fractions being one-half, one-fourth, one-eighth and one-sixteenth.

We have thus considered one article of manufacture, the butt, and one machine, the steam engine. If to these we add the screw, used in all kinds of machinery and in all structures, remembering that all its dimensions, including the delicate adjustment of its threads, are expressed in inches and the fractions of an inch, we shall get some just idea of the use and value of this unit. If we run through the whole circle of the mechanic arts we shall find that the inch and its fractional parts are the guides in every work-shop of the nation. They are the elements of that comprehensive language in which science speaks to labor — in which every mechanic thinks and reasons

— in which he reads his scales and his working plans, and in reference to which all his tools have been constructed. If this language is changed to one having no equivalent elements, a curtain of darkness will be drawn between science and labor; for, every part of every article fabricated in the country will not only have its numerical name changed, but must be made of a different size, that its dimensions may be commensurable with the new unit.

In the practical knowledge of the mechanic arts the various parts of a machine or structure are understood, remembered and used, by considering, separately, the numbers which represent the parts, and not by considering the ratios. Hence, the introduction of this new language would obliterate, to a certain extent, all present knowledge. We should have to begin with new sets of machinery and new tools. We should have to teach new things in a new language, having no synonyms with the one now in use. This confusion in the mechanic arts would be about the same as would take place in our social relations if we were forbidden by law to speak any language except the French.

GENERAL CHANGES.

Besides the changes which the introduction of the metric system would produce in the mechanic arts, there are others which would follow of very grave importance. The committee in their previous report, stated the fact, that the introduction of the metric system would give a new name and a new numerical value to every measured distance in the country, and also a new name and a new numerical value to every piece of land. This would, of course, carry with it the necessity of changing the records of all real estate. For a century, at least, there would be a constant conflict in the public mind between the old language and the new — between the *foot* and the *meter*, the *acre* and the *are;* and the beautiful system adopted in the survey of the public lands, where the unit, one acre, is an exact part of the quarter section, of the half section, of the section, of the mile square and of the township, would be entirely destroyed, for the new unit, one *are*, is not commensurable with either of these quantities. In our cities the lots are all laid off and described in feet and inches. What would be the labor and the complexity of reducing them to the meter, with which they have no common measure, and of changing all the records to correspond thereto. The weight also and the measures of length and capacity being all changed, there would be corresponding changes in the price of every article bought or sold by

weight or measure, and the whole barter and trade of the country would be thrown into confusion by a new language, new scales of numbers and new prices. There would, in addition, be many changes in material things. Every weight, and measure, and scale, in every farm-house, in every grocery store, in every wholesale establishment, must be changed, and new ones substituted, made according to the laws and in harmony with the metric system.

NOMENCLATURE.

Mr. Adams, in his report, has truly remarked that the nomenclature "is a part of the metric system which has encountered the most insuperable obstacles in France," and what was said of France is equally true of every country where its introduction has been attempted. This is due, in part, to the unwillingness of a people to change terms in common use and to which they have been long accustomed, and partly to the construction of the system itself.

The system embraces four branches: linear measure, in which the unit is the *meter;* superficial measure, in which the unit is the *are;* measure of capacity, in which the unit is the *litre;* and weight, in which the unit is the *gramme.* Every word in the language of the metric system is composed of two parts, one part expressing the base unit, and the other denoting how many times, or parts of a time, the base is taken. Thus, we say, decameter, decimeter; hectare, centiare; decalitre, decilitre; decagramme and decigramme.

In each of the four branches, every word presents to the mind the base unit, and how many times that unit is taken, and the signification of the word is not understood until both its elements are distinctly apprehended. The mind analyzes a denominate number but in one way. First, to find its base; and secondly, to find how many times or parts of a time the base is taken. Hence, in the language of the metric system *the base unit is constantly presented to the mind.*

Instead of making the ascending units bases of successive aggregations, as in our present system, where we first aggregate on the smallest unit, the inch, then on the foot, then on the yard, then on the rod and then on the mile, we are obliged to express all distances, great and small, by aggregating and dividing the meter. This gives us numbers incomprehensibly great for large distances, and very minute fractions for all small measures. Were we to adopt the yard as our only unit of linear measure, the mile would be expressed by 1,760 yards, and the inch by one thirty-sixth part of a yard. Would these

numbers present to the mind as distinct ideas as one mile, one inch?

When we applied the decimal scale to our currency, where it is specially applicable, we did not use the cumberous nomenclature of the metric system; we did not say decadollar for eagle, decidollar for dime, centidollar for cent, and millidollar for mill; and yet, this is the cumbersome language which the advocates of the metric system would introduce into the mechanic arts, and into the every-day business of life. Carrying the base unit through the entire language of numbers makes that language cumberous and obscure. Ought we, then, to adopt a language of numbers in which the base unit is constantly repeated, and in which Greek, Latin and French terms are substituted for the sharp, short words of our own tongue to which we are accustomed? Ought we to introduce this longworded language, exclusively, into our elementary school books and the nursery, where the first instruction in numbers must always be given?

DECIMAL SCALE.

In regard to the decimal division of the unit, Mr. Adams has truly said, that it is a perfect contrivance for computation, but inapplicable in the division of material things. The half, the fourth, the eighth and the sixteenth, certainly appear to be the natural divisions in the descending scale of numbers; and the fact that these fractions are found in all the workshops, and so far as the inquiries of the committee have extended, the decimal division nowhere, would go to show that they are the most convenient divisions wherever mind handles matter. Indeed, after the French system of numbers had been adopted, provision had to be made, by law, for the use of the half and the double, of each denominate unit, so that the decimal division, in regard to material things, has been virtually abandoned, even in France,

But there is no occasion for introducing the metric system, exclusively, in order to obtain the full benefit of the decimal division. We have it already — in our scale of abstract numbers — in our currency and prices, and in all the computations growing out of them — in our land surveys, where the chain is divided decimally and the products, in computation, can always be expressed in decimals of an acre — and in all the processes of leveling, where the entire work is expressed in feet and decimals of a foot. In fact, the tact and practical sense of the American people have already adopted the decimal system, with our own simple nomenclature, in nearly every case to which it is applicable.

Origin and Supports of the Metric System.

The metric system had its origin in the storms of revolution, and has been sustained by speculative philosophy, by commerce, and by compulsory legislation. The hatred of a king abolished the *pied du roi* and gave to the world a new system of weights and measures. Speculative philosophy, enchanted by the vision of a common weight and a common measure for all mankind, has embraced and urged forward a theory in opposition to all practical wisdom. Commerce, which regards the whole world as its appropriate sphere of labor and enterprise, and the interest of trade as paramount to all others, caught the inspiration of the new theory, which promises to enlarge its boundaries and multiply its profits. But it was found that this new theory, promising so much, deranged the mechanic arts, interrupted labor, changed prices, and was the parent of general confusion. For nearly a quarter of a century this contest went on in France, the birthplace of the system. The people finally prevailed, and the old system was essentially restored to them. But a new revolution gave new powers to the government and all the old weights and measures were finally swept away by compulsory legislation. How tenaciously the people clung to their old methods, which had sprung up from their necessities and were specially adapted to their wants, is fully shown by Mr. Stevenson, whom we have already quoted. He seems to have made the tour of Europe for the express purpose of collecting information in regard to the operations of the metric system in those countries where it has been introduced. Here is a part of his testimony:

"There (the north of Italy), the meter is adopted, and yet I bought one of a stock of a workman's rules, at Chatillon, of the length of twenty-four old inches, and jointed to suit those inches, and graduated on one side in inches, and on the other side in centimeters, the twenty-four inches being rather more than a meter. I found a similar rule in use by workmen on the shores of Lago Maggiore."

"At Mulhausen, which, though recently detached from France, has been subjected to the same long course of metric legislation, I found that the meter rules, in stock, in a large hardware shop, were graduated one side into 100 centimeters, and on the other in thirty-six 'pouces' (inches), showing that the 'système usuel,' permitted in 1812, still retains its hold, although now illegal, and the necessity felt for having such a unit as the inch. In the same shop I saw some tools for cutting to various thicknesses, and the scale on which the cutting edge moved was graduated in these inches. I found also that

the various lengths of nails were described as inch, inch and a half, etc. Thus, the language of the law, after nearly a century of legislation, has not eradicated the old language of the workshop in the parent country of the metric system." Thus, the twilight of the past yet lingers in the horizon of labor, in despite of all penal enactments.

PRESENT STATE OF THE CASE.

The two standards of length to which the attention of the world is now directed are the imperial yard of England and the meter of France. The former is thirty-six inches in length, and the latter thirty-nine inches and thirty-seven hundredths. The former is divided into feet and inches, and aggregated according to our scales of denominate numbers; the latter is divided and aggregated according to the scale of tens. The question presented to us is simply this: shall we increase our standard three inches and thirty-seven hundredths, adopt the decimal division exclusively and introduce into our language the French nomenclature?

At first sight it seems incredible that so small a change in the standard should produce such radical changes in the entire system. But the standard is the first element in the language of numbers; when it is changed all others dependent upon it must be changed also. If, at the same time, we change the scale of numbers and the nomenclature, we have an entirely new language, and can readily see the confusion which must follow. To this is superadded the attempt to extend the decimal scale, so admirably adapted to computation, to the divisions of matter and to the mechanic arts, to all of which it is utterly inapplicable.

COMPULSORY LEGISLATION.

If we adopt the metric system by compulsory legislation, and exclude every other, how are we to bridge over the interval which must elapse before the people become educated in it? If we permit the use of the old weights and measures, theory and experience both show that they will never be abolished. If their use is forbidden, how can we instruct the people in the use of the new ones? Besides, how can we furnish, in the whole range of construction and the mechanic arts, the parts and pieces, in the old measures, necessary to supply wear and tear and the dilapidating effects of time?

Peoples who have Adopted the Metric System.

It is claimed by President Barnard that the metric system, having been already adopted extensively, and being the only system having any claims to universal acceptance, must finally become the system of the world.

How far the metric system has proved acceptable to those countries where it has been introduced, the committee have no positive and conclusive evidence. That the struggle was long and sharp in France, is well known, and the testimony of Mr. Stevenson assures us that, after nearly a century of legislation and trial, the old system is clung to in the work-shops. The committee feel assured, from information on which they can rely, that, if it were possible, the French people would to-day abolish the metric and return to the old system. But, with the exception of France and Germany, the countries which have introduced the metric system have experienced little of its effects on the mechanic arts. In England, where the subject has been long considered, and after much discussion, a bill to render the system compulsory was rejected by Parliament in August of last year. It is quite obvious that we should take no step in the matter, except in conjunction with England; for with that country we are most intimately connected by the ties of a common language and an extended commerce.

But the committee do not rely much on these external evidences of the workings of the metric system. They have confidence in science and in philosophy. They do not believe that an educated and practical people will upset and derange their entire system of mechanical labor — change all the measures of their agricultural products — all the weights to which they have been accustomed, and all the measures of their land, for the sake of enjoying common and inconvenient units with the rest of the world. They do not believe that the advantages of uniformity are great enough to compensate for an entire change in all the language of number and quantity, and the substitution of a new one, compounded of the Greek, the Latin and the French. The following are the conclusions of the committee:

1. Considering the intimate relations between words and things, and that by use in their elementary forms they become almost identical, we deem it unjust to a people to take from them, by law, the simple language of number and quantity to which they are accustomed, and to substitute therefor the cumbrous phrases of a foreign tongue.

2. Considering the great changes and confusion which the introduc-

tion and exclusive use of the metric system would produce, in our language, in our elementary ideas of number, in our domestic trade, in our deeds of record, and in the mechanic arts, we should deem such introduction a public misfortune.

3. Considering that by the comity of nations each should not be insensible to the common interests of all, we commend the liberal spirit of legislation which has placed the metric system on the same footing with our own, and deem that this is all which its friends have a right to ask.

CHARLES DAVIES, *Chairman.*

ALBANY, *August* 7, 1872.

THE METRIC SYSTEM OF WEIGHTS AND MEASURES.

By JAMES B. THOMSON, LL. D.,
of New York City.

REPORT OF THE MINORITY.*

Mr. Chancellor and Gentlemen of the Convocation: The minority of the committee appointed in 1869 to consider and report what further steps, if any, may be necessary in respect to the Metric System of Weights and Measures, respectfully submit the following:

It is with extreme regret that we cannot concur with our distinguished colleagues who constitute the majority of your committee. But the interests of science, of commerce, and of civilization alike constrain us to dissent from the views expressed by them, and to enter a respectful but earnest protest against the conclusions at which they have arrived. These views and conclusions, coming from gentlemen who are eminent for mathematical and legal learning, and therefore ought to be able to appreciate the incongruities and absurdities of the present system, are, we confess, very extraordinary. The more so, since the distinguished chairman, over his own signature, so recently declared his "conviction that the Metric System is nearer perfect than any which can be reached, and that its adoption would greatly simplify and abridge all the applications of numbers to the various operations of commerce and business." The explanation of these extraordinary views, and this radical change of opinion, is chiefly found in a misconception of the aims of the friends of metrological reform, and of the practical working of the Metric System, if introduced into our country.

The report of the majority assumes that the friends of metrological reform demand the *adoption* of the *Metric System*, and the exclusion of our *present system simultaneously*. They assert that the question is, "Shall the Metric System of Weights and Measures be adopted by compulsory legislation, and the use of every other system forbidden?" They accuse "the friends of the Metric Sys-

* NOTE.—It is stated in the preface to the report of the majority in 1870, that "Professor Thomson has not acted with the committee, and is of course not responsible for its doings." It is due to him to say that the reason he did not act with them was because he had no knowledge of their action until after their report was submitted to the Convocation.

tem of being here to-day to give such a direction to the sentiments and opinions of this Convocation as shall lead to that result." Again, they declare that "wherever the Metric System has been introduced, the exclusion of every other system, by penal enactments, has been found necessary." Allusion is also made to "dragooning the people into its use;" "fierce conflicts" are predicted in this country, where "the people are free and less habituated to blind obedience to imperial edicts." We have heard, Mr. Chairman, of the "Poetry of Mathematics." Here we have a specimen of what may be called *Sensational Mathematics*. These mathematico-sensational flourishes, if they have any meaning, assume that the friends of the Metric System have some sinister design concealed under the garb of metrological reform; that their aim is to take the people by surprise; to cheat them out of the old system and force them into the immediate use of the new.

We beg leave to assure the Convocation and our colleagues, whose prolific imagination has pictured these frightful scenes, that the advocates of metrological reform in this country repudiate all such designs. They neither ask nor desire such legislation. Their object is alike *pacific* and *beneficent*, and, while they pursue it with untiring zeal, they intend to employ no other than peaceful measures.

The Object of Metrological Reform.

The aim of the advocates of metrological reform is:

First. To establish a *uniform, international system* of weights and measures, of such a character that its base and derivative units shall be *commensurable* with each other.

Second. That its *derivative* units shall *increase* and *decrease* by the *decimal* or a *uniform* scale.

Third. That its different denominations shall be designated by a *convenient, common nomenclature*. The manner by which they hope to secure this reform will be explained hereafter.

The origin of the present system of weights and measures is veiled in obscurity. We received it from the father land; England borrowed it from Rome, Rome from the Greeks, the Greeks from their ancestors, and so on to a remote age. Whoever may have suggested its *original* units, the grain, the barley-corn, the hand, the foot, etc., and whatever may be said of the fitness of these standards of comparison, certain it is, the *details* of the system were not the offspring of philosophical research, but of ignorance or chance. Yet amid the rise and fall of States and Empires, and all the political

revolutions that have swept the earth during the past 2,000 years. amid the gigantic conquests in science, in agriculture, and in commerce; amid the vast improvements in simplifying and abbreviating mathematical computations, which followed the introduction of the decimal notation into Europe, strange as it may seem, the essential features of this anomalous system of weights and measures which sprung up in the world's gray dawn, held undisputed sway over all enlightened lands down to the commencement of the nineteenth century, and is still in vogue among all the English-speaking peoples of the present day. True, our Anglo-Saxon fathers expanded it into *different kinds* of weights and *different kinds* of measures, and substituted the foot and arm of some modern hero or potentate for those of an ancient or fabulous predecessor; but its leading features are still essentially the same, with its absurdities not only *unmitigated*, but *increased*. However well the system may have answered the few and simple wants of *remote* periods of antiquity, we need not say that it is *totally inadequate* to the present advanced age; an age in which space is annihilated by the applications of science, and knowledge is communicated from land to land by lightning lines stretching around the globe.

Objections to the Present System.

Among the numerous objections to the present system are:

First. The standards by which its *base-units* are determined, are *arbitrary* and *perishable*. These characteristics destroy all confidence in the experiments and researches of other ages and countries, encourage fraud, defeat the ends of commercial justice, and thus weaken the bonds that hold society together.

Second. Several of its base-units are *incommensurable* with each other. Thus, the linear rod (16½ feet) is incommensurable with the hand, the foot and the yard; the square rod (272¼ square feet) with the square foot and the square yard; and the cubic foot, the bushel and the gallon, with each other, etc.

Third. Its base-units are also incommensurable with the base-units of all other systems of metrology. Weights and measures are the necessary instruments of commerce. Hence, incommensurability of the base-units of the weights and measures of different countries, is a serious obstacle to diplomatic and commercial intercourse.

Fourth. The scale of increase and decrease is *irregular* and *variable*. It ranges all the way from 2 to 1,728; and, as if to complete the inconvenience and absurdity of the system, *ten* of these ratios are *mixed numbers*.

Taking the hand and foot as base-units, the application of the decimal scale to the various denominations arising from them is impracticable; for 10 hands are *more* than a foot, 10 feet *more* than a yard and *less* than a rod, etc.

Fifth. Most of the *terms* by which its 70 *different* denominations are designated, are *primitive* words, and are neither suggestive of the thing signified, nor have they any analogy to each other to aid the learner in remembering them.

Sixth. Its *nomenclature* is a monument of confusion and absurdities. It employs *three* nominally different pounds besides the money pound, *three* kinds of length measure, and *four* kinds of capacity measure. In the subdivisions it employs 9 terms in *two* different senses, 4 in *three* different senses, and 5 in *four* different senses; while the term ton, is used to signify a long ton, a short ton, a cubic ton, a shipping ton, a register ton, and a liquid tun. These double, triple and quadruple significations of the same word, make uncertainty more uncertain, and, taken together, form a medley calculated to bewilder the brain of the child, and blast all the redeeming qualities of the system.

Seventh. Owing to these great irregularities and apparent contradictions, the system necessarily consumes a *vast amount* of *time* and *labor* in learning it, and, when learned, is difficult to retain.

No one who has ever mastered these tables of weights and measures, and their applications, can forget the *time* and *toil* the victory cost him; and some, no doubt, can call to mind the *tingling sensations* which sometimes accompanied these efforts. And yet there are few, it is believed, who appreciate the *amount* of time and labor thus expended. Lord Brougham, after extensive consultation with teachers, came to the conclusion that "*one-third* of the time spent in mastering arithmetic would be saved by the adoption of a *decimal system* of weights and measures." Prof. Barret, a distinguished instructor for the artillery service, thinks "*two years* might be saved;" and Prof. De Morgan asserts that "the time devoted to arithmetic might be reduced by *one-half*, if not more, by the introduction of a decimal system." The opinions of practical teachers in our own country, who have been consulted as to the time consumed on this part of arithmetic, range from *one and a half* to *two and a half* years.

Assuming the *arithmetical mean* of these opinions as the standard, it takes pupils *two years* to acquire a tolerable knowledge of the system. The population of these United States, in round numbers, is 40 millions, and the average age of man 33⅓ years. In 33⅓ years, then,

a whole generation of 40 millions of children is to be educated. If one pupil wastes *two years* in mastering the present system, 40 millions of pupils must waste 80 *millions* of years in a single generation. And if we multiply these 80 millions of wasted years by the countless generations in our own and other English-speaking lands, whose intellects have been and still are trammeled by these *shackles*, the product swells beyond comprehension.

Moreover, after all this toil and expense in storing away these incongruities, how often the memory fails to reproduce them. How few people, how few men, even of liberal culture, can change Troy to avoirdupois weight, or liquid to dry measure, and *vice versa*, without the help of a book? How few can even read the cabalistic characters which represent the denominations of apothecaries' weight, and which so effectually conceal from the people not only the art of healing, but also the ignorance and blunders by which druggists and druggists' clerks every month, send so many to untimely graves.

Eighth. But the waste of time and toil caused by the system are not confined to childhood. It follows our young men from the schools to the counting-room and custom-house, and subjects them to immense inconvenience and labor, in regulating their accounts and adjusting the duties required by law. It presents its formidable front to the countless multitudes who throng the busy marts of trade, and imposes upon them also an intolerable burden in computing the quantities of the manifold exchangeable commodities embracing the products of the earth and of human industry, as coal, minerals, lumber, fruits, cereals, etc., and manufactures, from the coarsest to the finest fabrics. We hazard nothing in saying that the time and labor of the *thousands* of business men who are daily engaged in computing the values of these exchangeable commodities through the instrumentality of our present weights and measures, would be diminished a *hundred fold* by the substitution of a uniform international system of metrology founded upon the decimal scale.

The last objection to which we would advert, is the great hindrance which the system presents to the progress of science. We have seen that the base-units of the system are not only incommensurable with each other, but also with the base-units of all other systems of metrology in Christian lands. To appreciate the obstructions which the system interposes to the progress of science, let us briefly refer to the abnormal and inconvenient relations between the different denominations of the linear unit to those of capacity and weight by which they are determined. The books tell us that a cubic

foot of water is equal to 1,000 ounces avoirdupois. But this is merely its approximate weight, and in exact calculations must be taken with many grains of allowance.

According to the experiments of Mr. Hassler, a cubic foot of distilled water, at its maximum density, weighs only 998.0607 ounces, the bushel is equal to 1.24444 cubic feet, or 77.6274 pounds, and the gallon to 0.13368 cubic feet, or 8.38888 pounds of distilled water at its maximum density. Now, suppose the chemist or scientist wishes to deduce, by exact calculation, the weight of a body from its capacity, or its capacity from its weight, an operation of daily occurrence, who can estimate the expenditure of time and labor of a single operation?

And when to these unnatural relations between its own different denominations, we add the fact that its base-units are incommensurable with those of all other systems which, until recently, have prevailed in civilized lands, who can fail to see that the vast amount of time and labor required to change the results of experiments from the denominations of our system into those of another, has been and still is a most *serious hindrance* to the progress of science? With this incubus hanging over the world, the knowledge of one nation, in the language of Professor Hoffman, "is practically a sealed book to the students of others."

In view of these objections, we are brought to the inevitable conclusion that there is an *urgent necessity* for metrological reform; that the interests of commerce, of science, and of civilization, imperiously demand a uniform, international system of weights and measures.

The great problem is to find a system in which the entire family of civilized nations will unite.

Characteristics of a Universal System.

All agree that the *base-unit* of a universal system should be a *common measure* of all its derivative units; that its *derivative units* should increase and decrease by the *decimal* or *some uniform* scale; that its denominations should be expressed by *convenient* terms; and that its *standard* unit should be such as will remain unchanged from age to age; will be secure against accident and fraud and the ravages of time; one that may be verified when desirable, and restored if lost. In a word, that it shall be *invariable*, *indestructible* and *reproducible*. Fortunately for man, nature presents two such objects, each of which combines the three qualities of *invariability*, *indestructibility* and *reproducibility*, viz.: the *linear dimensions* of the earth and the *linear measure* of its *attractive force* embodied in the pendulum vibrating seconds.

Huygens, a distinguished Dutch astronomer, suggested a meridian as a standard as early as 1685, and the commission adopted it as the base of the *Metric System* in 1791. Cassini, of Paris, suggested the pendulum as a base about the commencement of the last century. England adopted this standard in 1824, and declared the length of a standard yard to be 36 inches, *such* that 39.13929 of them are equal to the length of a pendulum vibrating seconds in *vacuo*, at the level of the sea, in the latitude of London.* As these two are the only systems whose standards are based upon the laws of nature, and are already in extensive use, it is the opinion of distinguished scholars that the choice of a universal system must lie between them. Let us briefly compare their claims.

While the advocates of the English system insist on retaining the "short, sharp terms," now employed in its nomenclature, they generally admit that its derivative units must be brought into *commensurability* with its base-units, and the increase and decrease of its denominations into *harmony* with the *decimal* or a *uniform* scale, in order to make the system acceptable to the great body of nations.

Felton's Proposed System.

Among the various plans embodying these changes, the most popular that has come under our notice is the one developed by Mr. J. H. Felton, of England, and recently indorsed by the joint committee of the Chamber of Commerce and the Geographical Society of the City of New York. Its outlines are as follows:

The *unit* of *linear* measure is the present legal *foot*, which is subdivided into *inches* and *seconds*, and has only one *multiple*, which is called a *rod*. These denominations increase by the scale of ten; 10 seconds making 1 inch, 10 inches 1 foot, 10 feet 1 rod.† In square or surface measure, the link, the chain and the acre are the same as ours. The proposed denominations are *links*, *staffs*, *reeds*, *plats*, *chains* and *acres*, which increase by the scale of 10. The present *legal pound* is the unit of *weight*, the subdivisions of which are called *grains*, *scruples*, *drams* and ounces, and its multiples are *stones*, *hundreds* and *tons*. The unit of *dry* and *liquid* measure is the *gallon*,

* It is worthy of notice, that when this standard yard, so formally adopted and carefully deposited in the national archives, was destroyed by the burning of the Houses of Parliament, in 1834, a new yard, the one now in use, was formed, not by resorting to this pet standard of the pendulum, but by a comparison of all the scales and measures of any authority which could be collected together. And why? Simply because the former identical yard was wanted, not a different one, which, it was apprehended, from certain errors that had been pointed out, might result from a remeasurement of the pendulum.

† The *rod* is the highest denomination employed; because, it is urged, the *furlong* is practically obsolete, and the *mile* is not a measure of commerce.

which contains 10 pounds avoirdupois of distilled water. Its divi sions are called *grains*, *scruples*, *drams*, *gills* and *pints*, and its multiples *ankers* and *tuns*.

The chief arguments in favor of this system are: *First.* That its *nomenclature* consists of short, English words which are familiar to the ear. *Second.* Its *principal units* correspond in name with those already in use. These are plausible considerations. If we can pass from the present heterogeneous patchwork system to one that is acceptable to the brotherhood of nations, so easily as here set forth, the change is an object devoutly to be wished. But let us analyze the plan here proposed.

It is first assumed that children have a clear and definite idea of the meaning of the terms of the present system, because they are familiar to the ear. But however familiar to adults, everybody knows they are *new* and *strange* to children. Again, of the 26 terms or denominations which it employs in the four measures of distance, surface, capacity and weight, only 5 of them are taken in their present signification, 21 have new definitions, and 3 are used both in measures of weight and capacity, and therefore have a double meaning. The gallon or unit of capacity, differs from the present dry or liquid gallon, and therefore has no claim arising from present use. The foot, the chain and the pound are the only three of its units now established by law. Aside then from the antipathy to new words which led our ancestors to misrepresent the exactness of numbers, by calling 16 a dozen, 112 pounds a hundred weight, etc., an antipathy largely inherited by their descendants, the reasons in favor of this system are reduced to two—*First.* Three of its units are established by law. *Second.* Five of its terms are taken in their present signification.

Difficulties in Decimalizing our Present System.

The plan proposed to remedy the objections to the present system of weights and measures, has numerous and grave defects.

1st. Several of its units are *incommensurable* with each other. Thus, the gallon (10 pounds avoirdupois of distilled water) equals 221.8192 cubic inches. Again, the linear unit, as everybody knows, is the natural connection between linear and surface measure. But the linear link (7.92 inches), the square of which is a unit of land measure, is neither a decimal, nor yet an aliquot part of a linear foot or yard, consequently the square foot is incommensurable with the surveyor's unit of length and unit of surface.

2d. Some of its terms are employed in a *double sense*, and these meanings are all different from those in which they are now used.

3d. *Twenty-one* of its boasted familiar terms have *new significations*. They are wrested from that particular meaning which long established usage has assigned them, and are invested with a new and unfamiliar one.

The question here arises, how are we to know whether these 21 terms express the new or the old signification? And how is the pupil to decide upon the meaning of these ambiguous terms? It may well be doubted whether these old names with new significations, and double meanings, names which have no analogy to the thing signified, are not *more objectionable* than *new names* which are suggestive of the new ideas designed to be expressed.

In like manner it may be shown, that all attempts to ingraft upon our English nomenclature, commensurability of base and derivative units with the decimal notation, are attended with inherent, insurmountable difficulties, and are calculated to perpetuate the evils they profess to remedy.

The Metric System.

The other plan proposed to secure international uniformity of weights and measures, is the adoption of the *Metric System*.* The Metric System receives its name from the *Meter*, its principal standard unit of length. The meter is a ten millionth part of the

* The origin of the Metric System is due to France. In 1790, Tallyrand circulated among the members of the Constituent Assembly, a proposition to reform the heterogeneous system of weights and measures then in vogue, or rather to form a new one, founded upon the principle of a single and universal standard. The proposition, with some modifications, was adopted by the Assembly, and sanctioned by the king (Louis XVI), August 22, 1790 That the new system might obtain general favor, Great Britain and other nations were invited to unite with France in the formation of a joint commission to carry out this plan. Great Britain, it is deeply to be regretted, did not accept the invitation; but Spain, Denmark, Tuscany, Switzerland, etc., were represented in the convention, which embraced some of the most eminent mathematicians and scientists of Europe. By a decree of the assembly, a committee of five of the ablest members of the Academy of Sciences, Borda, Lagrange, Laplace, Condorcet and Monge, were appointed to select a natural standard for the unit of length, and the unit of weight in relation to that of length. Three objects presented themselves as suitable standards for the linear unit, viz.: a quarter of the terrestrial meridian, a quarter of the earth's equator, and the pendulum vibrating seconds. After careful consideration, the committee recommended the quadrant of the meridian as the standard of length, and a given quantity of water as that of weight. The measurement of the arc of a meridian, extending through France from Dunkirk to Barcelona, was entrusted to Mechain and Delembre, mathematicians of the highest eminence.

The determination of the unit of weight was assigned to Lefevre Gineau and Fabbroni, who decided that a kilogramme made of platinum, should represent a weight equal to the weight of a cubic decimeter of distilled water in a vacuum, at the level of the sea, and at its maximum density. Water was chosen as the standard of weight, because universally distributed, and easily obtained pure in every part of the globe. The commissions charged with these important operations, commenced their labors, under the auspices of the government, March 31, 1791, but owing to political troubles, it was not until the 22d of June, 1799, that the *meter* and *kilogramme* were finally determined as units of length and weight.

distance from the equator to the pole, and is equal to 39.37 inches nearly. From the meter, or *unit* of *length*, are derived the unit of *surface*, called the *are*, the unit of *capacity* called the *liter* and the unit of weight called the *gram*.

The several ascending and descending orders are *decimal multiples* and *submultiples* of these units, and therefore, increase and decrease regularly by the scale of 10.

The names of the higher denominations are formed by prefixing to the several units, the Greek numerals *deka*, *hecto*, *kilo* and *myria*, which respectively denote 10, 100, 1,000, and 10,000; as, dekameter, hecto-meter, kilo-meter, myria-meter. Those of the *lower* denominations are formed by prefixing to the same units, the Latin numerals *deci*, *centi*, and *milli*, which denote $\frac{1}{10}$, $\frac{1}{100}$, $\frac{1}{1000}$; as decimeter, centimeter, millimeter.

Objections to the Metric System.

We are first met by the objection of Sir John Herschell, that the quadrant of a meridian is not the best possible standard, that the earth's equatorial diameter, or polar axis, or "the length of a pendulum vibrating seconds under certain definite and normal circumstances," would be preferable. It is also added that "all meridians are not of the same length; and that the meter is not exactly the ten-millionth part of the distance from the equator to the pole," etc. Without stopping to inquire whether the objection of the learned astronomer may not justly be regarded as hypercritical; waiving also the assertion that all meridians are not of the same length, and that the meter was inaccurately determined, points which President Barnard shows have not yet been proved, it is sufficient for our present purpose to say, that if all that is claimed on these points be true, this would not detract essentially from the value of the Metric System. For, it should be observed, the *meter* is no longer an *abstract idea*, or a *mathematical conception*. It is a definite length—the length of a material object. It consists of a bar of platinum deposited in the archives of France, and is therefore a *concrete unit*. In this respect it is on equal footing with the present standard yard of the English system. It is exactly copied in measures within the reach of every branch of industry, and from its wide diffusion among the nations may readily become a *universal* standard.

Again, it is objected by our opponents, that the introduction of the system would cause certain manufacturing establishments great inconvenience and expense in changing their patterns and machinery.

In support of this objection, they quote largely from the speech of the Hon. Mr. Stephenson before the British Parliament, who enumerates among the sufferers, coopers, sawyers, manufacturers of hinges, bolts, screws, etc. "If the pound is abolished," he asks, "how can the candle-maker know how to make his 4's, 6's and 8's to a pound; and how will the housewife know whether her 6 candles weigh a pound?" To cap the climax, the honorable member indulges his grief over the anticipated abolishment of the milestones on the highways. "Are these to be shifted," he asks, "and are parliamentary trains, at a penny a mile, no longer to be heard of?" This was too touching! What wonder that Parliament straightway voted down the obnoxious reform! The disinterestedness of this objection reminds us of a whaling merchant who opposed free schools, on the ground that "if we educate our boys, they will no longer go before the mast; and who," he asks, "will man our whale ships? The introduction of free schools," exclaimed the deluded man, "will destroy the whale fishery and beggar our families!"

With regard to the manufacturers of hinges, etc., whether in Manchester, Eng., or Waterbury, Conn., we can only say that improvement is the order of the day; these varying patterns are the footprints in its march; and if the present owners of these establishments adhere to the styles now in vogue for ten years, the tyrant fashion will rule both them and their goods out of market. But suppose the introduction of the Metric System should cause manufacturers a temporary inconvenience and expense, shall the temporary interest of the few, with their annual dividends of twenty or thirty per cent, be allowed to override the welfare of the many, for all time?

Our opponents also object that the Metric System is inconvenient because it requires so many words or denominations to express ordinary quantities. In the next breath they tell us that, as a general rule, numbers are read in the lowest unit, which makes them too large for convenience.

These objections contradict each other, and therefore both cannot be tenable. Moreover, it requires but a slight glance at the system to see that neither is valid. What would be thought of the knowledge of an American who should read seventy-eight dollars sixty-two and a half cents, "as 7 eagles, 8 dollars, 6 dimes, 2 cents and 5 mills," or as 78,625 mills? Equally unnatural is it to read 78.625 meters, as 7 decameters, 8 meters, 6 decimeters, 2 centimeters and 5 millimeters, or as 78,625 millimeters. Again, that troublesome lot of ground of 25 feet front by 100 deep, which it is said must be described as 7 meters, 6

decimeters and 2 centimeters front by 30 meters, 4 decimeters and 8 centimeters deep, is properly described as 7.62 meters front by 30.48 meters deep. And instead of expressing 150 miles, the reputed distance from Albany to New York, by 229,680 meters, or by 264,000 paces, it would naturally be expressed in round numbers, as 240 kilometers, the ordinary unit for long distances. It is unnecessary to say that a quantity expressed by the Metric System may be read in any single denomination which shall be chosen as the *unit*, the lower denominations always being *decimals* of that unit. The unit is chosen which is best adapted to the quantity desired to be expressed.

It is further asserted that the introduction of the Metric System "would change the records of our entire landed property." Do our learned colleagues mean by this that all our farmers would be obliged to have their deeds recorded again, in order to preserve a legal title to the property? *Ex post facto* laws, every school-boy knows, are unconstitutional. What effect the use of the Metric System can have upon the past records of our landed property we confess our inability to see. Every transfer of real estate requires a new record, but this record does not disturb the former. The validity of titles, the great landmarks of an estate or township, the directions of the boundary lines, etc., are no more affected by translating the dimensions from the given number of rods, feet and inches, "more or less," as formerly described, into meters and decimals of a meter, than if these dimensions were expressed in chains and decimals of a chain, according to present usage.

It is also urged that the introduction of the Metric System would *obliterate*, to a certain extent, all present knowledge; that as great confusion would follow as if we were forbidden to speak any language but the French. This argument assumes that the human intellect is so constituted that learning a new science necessarily crowds out an old one, and consigns it to oblivion. It implies that new ideas are necessarily hostile to old ones, and by reason of their incompatibility they cannot dwell together harmoniously in the same mind. Such objections are too frivolous to require refutation.

Finally, it is insinuated that the public mind will be influenced to oppose its use by the fact that the system comes from a foreign country. It is unnecessary to say that such insinuations do great injustice to the intelligence and scholarship of Americans. Why should a system of metrology, derived from a foreign land, be any more obnoxious to the American mind than a foreign system of Algebra, of Geometry, or the Mecanique Celeste?

Claims of the Metric System.

Let us now turn our attention to some of the more prominent claims of the Metric System.

First. Its *base unit* is a common measure of all its *derivative* units. This, we have seen, is an indispensable characteristic of a system designed for universal adoption.

Second. It is constructed upon the principles of the *decimal* notation; its denominations, like those of our National currency, and the orders of simple numbers, increase and decrease regularly by the scale of *ten.*

But it is said that, however convenient the decimal scale may be for scientific calculations, for some practical purposes it is not so well adapted as the binary, and the adoption of the *half* meter, the *quarter* meter, etc., is an abandonment of the system. This assertion adroitly assumes that if we adopt a system, we are necessarily tied down to all its details, and if we vary them, if we add to or subtract from them, we *abandon* the system. But is this so?

In monetary affairs we employ the *half* dollar, the *quarter* dollar, etc., and yet who ever presumed to say that we have abandoned the Decimal Currency of our fathers?

The whole civilized world uses the *half*, the *third*, the *fourth*, etc., of a unit, yet who ever dreamed that the great principles of the Arabic notation are abandoned by so doing? No more can it be said that the use of the *half-meter*, *quarter-meter*, etc., in business matters, is an abandonment of the Metric System.

Third. The *Meter* or *linear unit*, we have seen, is based upon one of the invariable natural dimensions of the earth. It is also a *convenient*, *medium standard* of measurement. It is worthy of remark, that the length of the meter is practically identical with the arithmetical mean of the English and American standard yard, the archine of Russia, the old French ell, and the pendulum which vibrates seconds; the difference being less than $\frac{17}{100}$ of an inch. Whatever may be the opinion of our opponents, taking the practical judgment of these enlightened nations, in connection with one of the elements of nature as our guide, we are warranted in saying, that the meter is a convenient medium standard of measurement.

Fourth. It commends itself by the *brevity* and *significance* of its nomenclature. And yet the majority of your committee complain that the terms are long and hard. That each word consists of two parts, a base and a prefix, etc. Let us analyze this point. Is a

science to be discarded because its technical terms are hard and long? If so, what will become of modern chemistry, mineralogy, botany, and the whole catalogue of natural sciences? And with what consistency can the advocates of a system embracing such terms as "avoirdupois weight, apothecaries' weight, hundred-weight, penny-weight, hogsheads, scruples," etc., complain of the hard and "long-worded language" of the Metric System? It is agreed by all parties that the technical terms of every science should be *simple*, *exact*, *comprehensive*, and *few* as possible.

Let us apply this test to the metric nomenclature. To designate the different denominations of distance, surface, capacity, and weight, the Metric System employs *twenty-eight* terms only. Of these terms, *seventeen*, like *eagles* and *dimes* in our decimal currency, are not used in business calculations. *Eleven words*, then, practically constitute its *whole vocabulary*. Of these *eleven terms*, the *four* base-units, the *meter*, *are*, *liter* and *gram*, are *primitive words*. The remaining *seven* are formed by prefixing to the base, certain *numeral adjectives*, four of which are Greek and three Latin.

Now we submit, whether a nomenclature can be found; nay, whether it is possible to conceive of one, by which the *weight* and *measurement* of all objects, from the *minutest animalcule* that floats in air, to the *mightiest globe* that revolves through space, can be expressed by so *few*, *simple*, *exact*, and *comprehensive* terms. Each denomination has a *distinct name*, and each name a *definite meaning*, "no two words express the same thing, and no two things are signified by the same word."

With respect, then, to simplicity, exactness, comprehensiveness, and fewness of terms, the *metric nomenclature*, we venture to affirm, stands unrivaled.

Fifth. The metric nomenclature has the further recommendation of being emphatically *cosmopolitan*. A terminology borrowed from a living language, can hardly fail to excite the prejudice of inferior nationalities, much more that of rivals and superiors. But the Metric denominations being derived from the classic languages of Greece and Rome, which have had such an important instrumentality in *molding* all modern tongues, and have so *greatly enriched* the science and literature of all modern nations, is *beyond* the *reach* of jealousy and criticism, and must readily secure *universal* favor.

Sixth. Another advantage of the Metric System is, that it is easily *learned*, easily *retained*, and easily *practiced*. Instead of requiring months and years to become familiar with a long catalogue of varying

scales, and the practical applications of terms of double and triple meaning, which are often forgotten in less time than is spent in memorizing them, the pupil has to learn only 11 words, 7 of which are suggestive of their exact signification, and the system is effectually and permanently mastered. Nay, more; as soon as the value of the *four* base-units are fixed in the mind, the values of all the derivative units, being formed by multiplying or dividing the base by 10, are at once apprehended. Its denominations are reduced from higher to lower, and from lower to higher terms, by simply removing the *decimal point* to the right or left, as in reducing our national currency to higher or lower denominations; and all its operations, in adding, subtracting, etc., are identical with those in simple numbers and decimals.

Seventh. The system has the *cordial support* of the great commercial, scientific, and educational interests of the age.

The International Statistical Congress, an institution inaugurated within the last twenty years, for the purpose of collecting the facts pertaining to the different exchangeable quantities of commerce, whether natural or industrial, at once felt the necessity of having a common standard of comparison and common terms of weights and measures in which to express the results of their inquiries in order to make them available. This learned body of political economists adopted the Metric System as the standard of comparison, and employ its terms in recording all statistical information respecting the objects of their researches.*

The system was unanimously indorsed by the International Conference on Weights and Measures and Money, held at Paris, in 1867. At this conference twenty-two different nations were represented, among which were Great Britain, Russia, and the United States, and among its accredited delegates were Professors Leone Levi of London, De Jacobi, of St. Petersburg, F. A. P. Barnard of New York, and many of the most eminent mathematicians and scientists of the age.

Again, the British Association for the Advancement of Science, and the Imperial Academy of Sciences of St. Petersburg have repeatedly memorialized their respective governments in favor of its adoption.

In England its adoption has been asked by more than forty chambers of commerce and boards of trade, farmers' clubs and workingmen's associations, and been advocated by such eminently scientific and practical men as Sir Wm. Armstrong, Sir Joseph Whitworth, and Sir Wm. Fairbairn.

* Report of Hon. Samuel B. Ruggles.

In our own country its adoption has also been recommended by the National Academy of the United States, by the American Association for the Advancement of Science, by the National Teachers' Association, the American Institute of Instruction, the New York State Teachers' Association, etc., etc. On the other hand, it is believed that within the last twenty years not a single scientific association or journal in this or foreign lands, of respectable standing, has opposed its adoption. It remains for this Convocation, the highest educational representative body in the Empire State, to say whether it is prepared to be the first to put itself upon record in opposition to the system.

Finally. The Metric is the *most available* system of weights and measures that has any claim to universal adoption. The commercial and scientific movements of the nations that have recently been brought into juxtaposition by the electric wires, clearly indicate the certainty that a universal, international system of metrology must and will prevail. Its final triumph is a mere question of time. But we have already seen that the choice lies between the Metric and the English systems. Which of these systems then presents the most favorable prospects of success?

Scarcely seventy-five years have elapsed since the former was inaugurated. Its early history was surrounded by many of the most unpropitious circumstances. For years it was opposed by the combined influence of long established habits of ignorance, bigotry, political jealousy and hate; yet its simplicity and exactness have conquered the deep rooted prejudices of one people after another, till to-day it numbers among its followers twenty-one different countries, and is the only legal system of more than two-thirds of all civilized lands.* Can any sane man therefore expect that all these peoples will be ready to abandon a system so highly satisfactory to them and adopt our English system, with which they are but slightly acquainted, and whose irregularities they instinctively dread? The action of the British Parliament and of our own Congress seem to have anticipated the answer. The former, in 1864, and the latter, in 1866, passed laws permitting the employment of the Metric System throughout their dominions,

* The following countries have adopted the Metric System in full: France, the French colonies, Holland, the Dutch colonies, Belgium, Spain, the Spanish colonies, Portugal, Italy, Germany, Greece, Roumania, British India, Mexico, New Grenada, Ecuador, Peru, Brazil, Uruguay, Argentine Confederation, and Chili, the total population of which is 336,419,598. The following have adopted metric values, and may be considered as committed to its exclusive use in a few years: Wurtemburg, Bavaria, Baden, Hesse, Switzerland, Denmark, Austria and Turkey, whose population is 84,039,209. Add to these Great Britain and the United States, with a population of over 70,000,000, who may legally use it, and we have a grand total of more than 490,000,000.

with the evident expectation of its ultimate use. Indeed, it has already become the principal method used by the British and American analytic chemists and physicists in recording the results of their labors.

In view of these movements, every nation imbued with a spirit of liberality and a just regard for the good of the race, must *pause* before it opposes, on the narrow grounds of a personal preference for a *vernacular nomenclature*, a system which, confessedly, has all the fundamental elements of *usefulness*, and has already advanced so far in its career to *universal adoption*.

But here we are asked: "Is the introduction of the Metric System into our country a possibility?" "Can full-grown Americans be persuaded to *lay aside* their old tables and *learn* new ones?" "Will the minor tradesmen be induced to sell their wares by *meters*, *liters* and *grams*?" These questions neither surprise nor alarm us. They are evidently the *offshoots* of *self-interest*, or of the love of ease which too often springs up in the minds of men on the shady side of fifty.

Scientific Reforms of the Past.

Among human achievements during the past thousand years are three memorable reforms, which were as radical and difficult as the one now proposed. We allude to the Introduction of the Arabic Notation, the Reformation of the Calendar, and the Substitution in our own country of the Decimal for English Currency.

When the Arabic Notation was first brought to the doors of Europe, and asked for admission, the veteran conservatives and petty tradesmen of that age asked the same questions and interposed the same objections. Nevertheless, the *simplicity* and *comprehensiveness* of the system, without prestige, or royal patronage, or compulsory legislation, *swept* the cumbersome modes of calculation of previous ages into oblivion, and at length secured *universal use*.

So thought and talked most of the nations of Christendom, when Gregory XIII first proposed the reformation of the Calendar, which set forward the vernal equinox from the 11th to the 21st of March, and thereby changed all the social, ecclesiastical, political and scientific dates of more than twelve hundred years. The excitement was so intense when the new Calendar (new style) was adopted in England, in 1752, that the people ran after the carriages of the ministers and cried, "give us back our 11 days." Nevertheless, the importance to science, to social and religious institutions, of having *civil* dates coincide from age to age with the return of the several seasons of the year, won a favorable hearing for the new Calendar. At length, individual and

national prejudice being overcome, one country after another wheeled into the ranks of its supporters, until every Christian land save Russia, long since adopted it to the exclusion of the Julian method.

So, likewise, felt many of our revolutionary fathers, when, in 1786, the Congress of the United States adopted the Decimal System of Currency. Nevertheless, after a sharp and protracted conflict, we have lived to see the old *sixpences* and *shillings* and *pistareens*, worn smooth by the *pinchings* of *avarice*, swept into the *crucible* and transformed into Decimal Currency. The superiority of the *Decimal* over the *old State currencies*, at length conquered ancestral prejudice, and trod under foot the selfishness of petty shopkeepers and money changers. The logic of these events is without a flaw. They clearly show the power of man to reform usages which have been intrenched behind the strongholds of prejudice for ages. The last of these reforms was achieved on American soil, and affords living proof that free-born Americans will be ready to lay aside a cumbersome, obnoxious system of metrology for a new and better one, as soon as they see that *interest* and *convenience* require the change.

How this Change is to be Effected.

The change from our own to the Metric System is doubtless to be accomplished, if accomplished at all, by the irresistible force of public opinion. But how is public opinion to be enlightened and concentrated upon this point? We answer by giving to the metric the same facilities for being understood and practiced that are accorded to our own system. But our colleagues say that "legislation *has* placed the Metric System, in all respects, on the same footing with our own," and admonish us that "this is all which its friends have a right to ask." It is true Congress, in 1866, passed a law permitting the Metric System to be used throughout the United States, but provided no means for disseminating a knowledge of it among the people.

The Sultan of Turkey has recently issued an edict permitting his subjects to embrace and practice the Christian religion throughout his dominions. By parity of reasoning, then, Christianity, "in all respects, is placed on the same footing with" Mohammedism throughout the Ottoman empire.

Let us see how the case stands. From time immemorial, the Moslem has been taught to love and obey the Koran; he inhaled its spirit upon his mother breast; his veneration for its principles has grown with his growth and strengthened with his strength. Around it cluster the influence of prestige, the traditions of many a hard fought battle in its defense, and the sacred memories of a long line

of ancestors, who sacrificed their lives in the propagation of its dogmas. At length the devotees of Mohammed are informed that the Bible presents a more excellent religion than the Koran, and the Sublime Porte grants them permission to adopt it. But as yet the masses know nothing of this new religion, except that it is a rival code of morals, which imposes upon them new doctrines and duties, the nature and extent of which they do not understand.

This is precisely the condition in which the Metric System is now placed in the United States. We ask, then, does the legal permission to use a system of metrology, of whose principles and application the people are ignorant, place that system in all respects on the same footing with one which for centuries has held a prominent place in every curriculum of study, and which every man, woman and child in the land, from the chief magistrate down to the humblest citizen, is compelled to use in procuring the daily necessaries of life? Is it unreasonable, then, for the friends of metrological reform to ask that the *disadvantages*, not to say *disabilities*, under which the Metric System is now placed in this country, may be removed, and that all classes of the community may become sufficiently acquainted with the system to pronounce an intelligent judgment upon its merits?

But how are the people to be made acquainted with its principles and applications? We answer, *negatively*, not by simple legislation; not by the strong arm of power, "vi et armis;" nor yet by mere resolutions of distinguished scholars and learned societies. No human legislation nor arbitrary power can transform ignorance into knowledge, neither can individual or associated resolutions enlighten the public mind; consequently, however important all these instrumentalities may be in directing attention to the subject, they cannot remove the difficulties by which it is surrounded.

The *first* and most *important instrumentality* in removing these obstacles is the *school-room*. Let the system be introduced and carefully taught side by side with our own in all places of learning, from the primary school to the university, and the most formidable of the obstructions will at once be removed. We, therefore, most earnestly commend this step to school committees, to boards of education, to superintendents of public instruction, and to all corporate bodies whose province it is to direct the studies of children and youth.

Another important method of disseminating a knowledge of the system is, to discuss its claims in Lyceums, Atheneums, and other associations for mutual improvement.

In the next place, let all quantities of domestic and foreign goods,

upon which excise or import duties are levied, and all the legal weights of matter allowed to be transmitted through the Post-office Department, with all medical prescriptions and recipes of druggists, be expressed, both in the denominations of our own and the Metric System. Again, let all documents issued by the Bureau of Statistics, and the different State Departments which refer to exchangeable quantities, be expressed both in metric and English denominations.

Last, but not least, let the *co-operation of the press* be invoked by the friends of reform. In the dissemination of knowledge, and the formation of public opinion, the power of the press is proverbial, I had almost said *omnipotent*. This stupendous power, we need not say, is ever ready to lend its services to the advancement of knowledge and the cause of humanity.

Let all these forces be secured, and the difficulties which now surround the system will disappear, and the people be prepared to appreciate its merits. The favorable tide of public opinion, formed at the well springs of education, will soon roll through the land with irresistible force. Seeing its great *simplicity*, its *comprehensiveness*, and its *superiority* over the present cumbersome system, all classes of the business community will readily adopt it, and the change is peaceably consummated.

We have now glanced at the *leading features* of the two rival systems of weights and measures, and the means by which we expect to see the final triumph of the former over the latter. Viewed from this stand-point, it is not too much to say that the system we advocate possesses the essential elements of *simplicity*, *comprehensiveness*, and *universality;* that its general adoption would cause civilization and commerce, by a single leap, to *spring* forward half a *century*. If these views are correct, it follows that of all the great problems which now engross the attention of the world, few are more *important* and *far-reaching* than the *unification* of weights and measures. It is a problem in which every nation and class of society on the globe, from the rudest to the most refined, have a common interest, and are bound to contribute, according to their ability, to its solution.

Our country was the *first* to inaugurate a system of *decimal currency*, which won *general* admiration. Though we cannot be *first* in extending this principle to weights and measures, Heaven forbid that we should *oppose* its application to them. Such a course would argue demoralization of intellect, and bring lasting reproach upon our national character.

But we leave the subject with the guardians of science and those

who minister at the altars of education, with the fullest confidence that its intrinsic merits are destined to win for it universal favor. In the prophetic words of the venerated John Quincy Adams, "If man upon earth be an *improvable* being, if that universal peace which was the object of a Savior's mission, and which is the *desire* of the philosopher, the *longing* of the philanthropist, and the *trembling hope* of the Christian, is a blessing to which the futurity of mortal man has a *claim of more than mortal promise, then this system of common instruments* to accomplish all the changes of social and friendly commerce will furnish the *links* of sympathy between the inhabitants of the *most distant regions;* the *Meter* will *surround the globe* in USE as well as in *multiplied extension*, and *one language* of *weights* and *measures* will be spoken from the *equator* to the *poles*."

In this cursory view of the subject, we have endeavored to show the importance of metrological reform, the defects of our own system, the advantages of the metric, and the means by which a universal system may be secured. The conclusions we have reached may be summed up in the following resolutions:

Whereas, The commercial, diplomatic, and scientific intercourse between different nations is widely extended and rapidly increasing; and whereas, international intercourse, heretofore seriously impeded by the irregularities and imperfections of our own and other systems of weights and measures, would be greatly facilitated by a common system, in which all quantities of exchangeable commodities, scientific experiments and statistical information might be expressed; therefore,

Resolved, That in the judgment of this convocation, effectual measures should at once be taken by the friends of commerce to establish a uniform system of metrology for the use of the civilized world.

Resolved, That in order to be acceptable to the great family of nations and fulfill the great objects of its mission, said system should be founded upon an invariable standard and the decimal notation, that its base-units and derivative-units should be commensurable with each other, and be expressed in simple, concise terms.

And whereas, The Metric System, by common admission, "combines these elements in a higher degree than any other system reached;" and whereas, this system has already been adopted by so many enlightened nations; therefore,

Resolved, That we earnestly recommend its substitution for our own system, as soon as the people can be prepared for the change.

Resolved, That the quickest and best way to familiarize the people with its principles and applications, is to teach them in all our public and private schools, and, in connection with the present system, to begin to practice them in ordinary traffic, in competitive examinations for the civil service, in the requirements for entering college, scientific schools, the naval and military academies, etc.

[Continued from Convocation Proceedings for 1868 and 1869.]

ANNALS OF PUBLIC EDUCATION IN THE STATE OF NEW YORK.*

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LEGISLATIVE GRANTS AND FRANCHISES ENACTED FOR THE BENEFIT OF ACADEMIES.

The following is a summary of legislation from 1786 to 1873, for the pecuniary relief and benefit of academies:

GOSPEL, SCHOOL, AND LITERATURE LOTS.

1786. "*An ACT for the speedy Sale of the unappropriated Lands within this state, and for other purposes therein mentioned,*" constituted certain State officers "commissioners of the land office," under whose direction the Surveyor-General was to lay out the waste and unappropriated lands belonging to the State into townships of sixty-four thousand acres each (ten miles square), as nearly as might be, and these townships into lots of six hundred and forty acres each, and construct a map of the same; and

"XI. That in every township so laid out, or to be laid out as aforesaid, the surveyor-general shall mark one lot on the map, *gospel and schools*, and one other lot, *for promoting literature*, which lots shall be as nearly central in every township as may be; and the lots so marked shall not be sold, but the lot marked, gospel and schools, shall be reserved for and applied to promoting the gospel and a public school or schools in such township; and the lot marked, for promoting literature, shall be reserved to the people of this State, to be hereafter applied by the legislature for promoting literature in this state." The Southern District of the State (New York, Kings, Queens, Suffolk and Westchester counties) was excluded from the provisions of this act. 1 *Greenleaf*, p. 280.

1790. "*An ACT for the further Encouragement of Literature,*" declares, by way of preamble, that "it is the duty of a free and enlightened people to patronize and promote science and literature, as the surest basis of their liberty, property and happiness;" that the Regents of the University "have represented that Columbia College, as well as the respective academies incorporated by the said regents in pursuance of the trust reposed in them by the legislature,

require aid and encouragement to remove the impediments under which they labour, from a deficiency of their funds, notwithstanding the contributions of individuals"; and that it appears "to this legislature, that a proportion of the public property will be wisely and usefully employed in enabling the said regents to remove those disadvantages, and to proceed with greater energy and success in accomplishing the important office assigned to them by law, as the guardians of the education of the youth of this state."

The said act therefore authorizes the Regents to take possession of and lease out certain described lands and tenements vested in the people of this State, and to apply the rents and profits thereof "for the better advancement of science and literature in the said college, and the respective academies now incorporated or hereafter to be incorporated under their superintendence and authority within this state, and in such manner and proportion as they shall conceive will best answer the ends of their institution and the true intent and meaning of this act: Reserving so much of the said rents, issues and profits as shall be found necessary to defray the expense which shall be incurred by them in the execution of their trust."

The same act further declared that, in addition to the provision which may arise from the rents and profits of such lands, a sum of money should be applied without delay for the same object, and actually appropriated the sum of one thousand pounds to Columbia College, out of any unappropriated money in the treasury. 2 *Greenleaf*, p. 316.

1792. "*An* ACT *to Encourage Literature, by Donations to Columbia College, and to the several Acadamies in the State,*" on the ground that the college had sustained serious losses in consequence of the late war, and was unable to incur such further expenses as would render it more extensively useful without pecuniary aid from the Legislature, appropriated for various wants of the college, out of any unappropriated moneys in or to be in the treasury after providing for certain specified objects, the aggregate sum of £7,900, and a further annuity of £750 for the term of five years; and a like annuity of £1,500 for five years, for the benefit of academies. 2 *Greenleaf*, p. 479.

SPECIAL LEGISLATION.

The earliest special legislation in favor of academies, during the period under consideration, seems to have been in behalf of

JOHNSTOWN ACADEMY.

1796. "*An* ACT *relative to certain confiscated Lands in the counties of Saratoga and Montgomery,*" provided: "That all the estate,

right, title, interest, claim and demand of the people of the state of New York in and to lot number thirty-six in the village of Johnstown in the county of Montgomery, consisting of half an acre heretofore by law appropriated to and set apart for the use of a school,* be and the same is hereby vested in the trustees of Johnstown academy and their successors in trust for the only benefit and advantage of the said academy." The trustees of the academy were further authorized by the same act, to sell said lot and to buy another for the same purpose, if deemed advantageous. 3 *Greenleaf*, p. 327.

Thirty years later, a sum of money was appropriated to this academy:

1826. "AN ACT *for the Relief of Johnstown Academy. Be it enacted*," etc., "That the treasurer shall pay, on the warrant of the comptroller, to the trustees of Johnstown academy, the sum of sixteen hundred dollars: *Provided*, That before the receiving the said sum, the trustees shall give security, satisfactory to the comptroller, for the faithful application of said sum to the erection of a suitable building for the said academy, or to the repair of the present building, and to the purchase of a library and chemical apparatus, and that they will duly account for the expenditure thereof to the regents of the university." *Statutes*, p. 90.

1827. "AN ACT *to amend*" the foregoing act of 1826, authorized the investment of any unexpended balance of the appropriation, and the application of the annual interest thereof to the payment of teachers, or the purchase of a library or chemical apparatus, at the pleasure of the trustees. *Statutes*, p. 205.

OXFORD ACADEMY.

1800. "*An* ACT *relative to Oxford Academy*," on the representation of the Regents of the University "that Oxford Academy has been accidentally consumed by fire, and that in their opinion legislative aid would be proper for the purpose of re-building said academy," authorizes the trustees to select one of the lots reserved for promoting literature in this State, and directs the commissioners of the land office to grant "letters pattent" for the same. *Statutes*, p. 237.

1821. Section VIII of "AN ACT *to divide the town of Windsor*," etc., appropriates "the annual income arising from the sale of the literature lot in the township of Fayette, in the county of Chenango,

* "Sir Wm. Johnson set apart a portion of the Kingsborough patent for the benefit of a free school. This reservation was respected by the courts of forfeiture, and trustees were appointed to take charge of the trust. The proceeds were appropriated to the use of this [Johnstown] Academy." *French's Gazetteer of the State of New York* (1860), p. 317; *Hough's Gazetteer* (1872), p. 312.

to the trustees of Oxford academy, for the use and benefit of said academy." *Statutes*, p. 239.

1822. The bonds and moneys received from the sale of lot No. 51, in the township of Fayette, were granted to the trustees of Oxford Academy, the principal of which was to be invested for the use and benefit of said academy. *Statutes*, p. 4.

1868. "AN ACT for the relief of the Oxford Academy," authorizes and directs the trustees of the village of Oxford to levy and collect, out of the taxable property of said village, one thousand and five hundred dollars, to pay up the indebtedness of said academy and for the improvement of the academic property. *Statutes*, p. 823.

"LITERATURE LOTTERIES, ETC., FOR THE JOINT BENEFIT OF ACADEMIES AND COMMON SCHOOLS."

1801. "*An* ACT *for the encouragement of Literature*," provided that "there shall be raised, by four successive lotteries, the sum of one hundred thousand dollars, that is to say, the sum of twenty-five thousand dollars by each lottery," from the net avails of which the sum of twelve thousand five hundred dollars was to be paid to the Regents of the University, for distribution to academies, and the residue into the treasury of the State for the encouragement of common schools, in such manner as the Legislature should from time to time direct. *Statutes*, p. 158.

1814. The commissioners of the land office were directed "to sell and convey all the lands belonging to the people of this state, lying and being in the towns of Maryland and Milford, in the county of Otsego, and the sum or sums of money to be received therefor, to pay over in the following manner, the one moiety thereof to such academy or academies as the regents of the university shall or may direct, and the remaining half to the treasurer, for the benefit of common schools." *Statutes*, p. 95.

1816. "*An* ACT *for the sale of certain unappropriated lands in the county of Otsego*," provided for the sale of certain lands in said county, and the application of the proceeds, one-half to such academy or academies as the Regents of the University should direct, and the other half to the credit of the common school fund. The third section repealed the aforesaid act of 1813. *Statutes*, p. 86.

CAYUGA ACADEMY.

1806. By "AN ACT *for the relief of the trustees of Cayuga Academy*," the commissioners of the land office were instructed to grant a certain 275 acres of land, in the township of Scipio, to the

trustees of said academy in fee simple, with the proviso that the said trustees pay the occupants of the land the value of the improvements made thereon. *Statutes*, p. 78.

1814. Lot No. 89, in the town of Cato, was granted to Cayuga Academy in the place of lot No. 36, in the town of Aurelius, which was previously granted to both Cayuga Academy and Union College, and which was held by the said college. *Statutes*, p. 79.

ORIGIN OF THE LITERATURE FUND.

1813. "*An* ACT *directing the sale of certain Lands for the benefit of Academies*," required the commissioners of the land office to sell, for the benefit of such academies, or to convey to such academy or academies as the Regents of the University shall direct, a certain tract of land in the town of Westford, in the county of Otsego. *Statutes*, p. 290.

1813. "*An* ACT *to authorize the sale of Lands appropriated for the promotion of Literature*," directed the commissioners of the land office "to cause all the land heretofore appropriated for the promotion of literature in this state, and situate in the military tract, or in either of the counties of Chenango or Broome, and now remaining unsold or not disposed of, to be surveyed and sold .... and to vest the proceeds in such manner as they may deem best calculated to secure the principal sum, and the regular payment of the interest thereon annually; and the Regents of the University shall make such distribution of the annual income amongst the several incorporated academies of this state as in their judgment shall be just and equitable, taking into calculation all former or present endowments made by the legislature of this state, except lot number twenty-four, in the town of Ulysses, in the county of Seneca, lot number thirty-six, in the town of Aurelius, in the county of Cayuga, and lot number eighty-five, in the town of Homer,* in the county of Cortland, which lots are hereby appropriated to the support of academies in each of the said respective counties in which the said lots severally lie, to be regulated in such manner as the legislature shall hereafter direct." *Statutes*, p. 319.

POMPEY ACADEMY.

The same act provided that lot No. 15, in Camillus, Onondaga county, be granted to Pompey Academy in fee simple, and directed the trustees of said academy, "whenever they shall sell the said lot, or any part thereof, to loan the money arising from such sale on landed security to double the sum so loaned, and on the payment of any such loan, again to reloan the same forever, and appropriate the

* 1822. The trustees of Cortland Academy were authorized to sell this lot and vest the proceeds for the benefit of their academy. *Statutes*, p. 8.

interest arising from such loans forever to the support and maintenance of instruction in said academy." *Statutes*, p. 319.

1814. The Supervisors of Seneca county were directed by law to take possession of lot No. 24, in the town of Ulysses, and to lease the same for the term of five years, for the support of academies in the said county, in such manner as the legislature should thereafter direct. *Statutes*, p. 74.

ERASMUS HALL ACADEMY.

1814. "*An* ACT *relative to Erasmus Hall*" provided, that "whereas, difficulties exist respecting the distribution of the school money in the town of Flatbush, in Kings county: therefore, ... the school money granted from time to time to that part of the town of Flatbush, ... commonly called the Old Town, ... be paid .... to the trustees of the academy of Erasmus Hall, ... to be applied to the education of .... poor children belonging to the said old town, and sent to the said academy, and who in the opinion of the said trustees shall be entitled to gratuitous education."

This act further provided that the trustees of said academy should account to the school commissioners of the town for the faithful application of the money, and report annually as to the number and progress of the children so instructed. *Statutes*, p. 91; *do.* 1827, 50*th sess.*, p. 336.

ONONDAGA ACADEMY.

1814. "*An* ACT *for the Payment of certain Officers of Government and for other purposes*," granted lot No. 9, less fifty acres, in the town of Lysander, Onondaga county, to the trustees of Onondaga Academy in fee simple. *Statutes*, p. 253.

1825. "AN ACT *for the relief of the Trustees of the Onondaga Academy*," granted lot No. 100 in the town of Lysander, less fifty acres, to the said trustees in fee simple, and directed that an appraisal of lots Nos. 9 and 100 be made, and that the amount of the appraised value of lot No. 100, in excess of the value of No. 9, be paid to the said trustees on the warrant of the comptroller; the interest arising therefrom to be applied for defraying the expenses of instruction, and for no other purpose whatever. *Statutes*, p. 353.

Chapter 429 of the Laws of 1859 (p. 972) provided that this fund might be applied to payment of debt on new building.

ST. LAWRENCE ACADEMY.

1816. The commissioners of the land office were directed to issue letters patent conveying lot No. 56, in the town of Potsdam, to the

trustees of St. Lawrence Academy, in fee simple, with the proviso that no lease of said lot shall be for a term of more than thirty-one years, and that the avails "be appropriated for the payment of wages of the tutors in the said academy and for no other purpose." *Statutes*, p. 161.

1825. "AN ACT *for the relief of the Trustees of the St. Lawrence Academy*" authorized the commissioners of the land office "to sell, on the usual terms of selling public lands, such lot or lots reserved for literary purposes, and not otherwise appropriated to the literature fund, or otherwise, as may be sufficient to raise the sum of twenty-five hundred dollars, and to pay the same to the trustees of the St. Lawrence academy, for the use of that institution: *Provided*, That the comptroller, before drawing his warrant for the payment of such money, shall be satisfied that the said trustees of the said academy shall have erected and completed, on ground owned by them in fee, and free from incumbrance, a substantial brick or stone building for an academy, of the value of at least three thousand dollars." *Statutes*, p. 170.

1825. The commissioners of highways of the town of Potsdam were authorized to convey part of the public square to the trustees of St. Lawrence Academy. *Statutes*, p. 383.

1826. "AN ACT *to carry into effect the Provisions of an act for the Relief of the Trustees of St. Lawrence Academy, passed April* 9, 1825," directs that "there shall be paid by the treasurer, on the warrant of the comptroller, to said trustees or their treasurer, the sum of twenty-five hundred dollars for the use of said institution, which said sum of money is hereby declared to be an advance for and in lieu of the sum of twenty-five hundred dollars, mentioned in the act, entitled [as above described], and the said sum directed to be raised by the act last mentioned, shall be raised in the manner therein mentioned, or in such other manner as the legislature shall hereafter prescribe, and become a part of the general fund of the state, as a reimbursement for the sum by this act authorised to be paid to the said trustees or their treasurer: *Provided however*, ... that the said trustees shall repay to the people of this state, such part of the said twenty-five hundred dollars as the said fund shall not be sufficient to repay, together with lawful interest from the time the said trustees shall receive the same." *Statutes*, p. 82.

1828. "The Trustees of St. Lawrence academy are hereby authorised to sell, in whole or in part, and convey in fee simple or otherwise, the lot of land granted by the act hereby amended [that of 1816, above referred to], and to invest the avails of said land in a permanent fund, the annual income of which shall be appropriated for the payment of the wages of the tutors in the said academy, and for no other purpose." *Statutes*, p. 208.

1841. The Comptroller was authorized to loan to the Trustees of the St. Lawrence Academy, two thousand dollars out of the capital

of the common school fund, for a term of ten years, at seven per cent, on a mortgage of academic property, and an insurance policy as collateral security. Any unpaid interest might be deducted from the distributive share of the literature fund. *Statutes*, p. 63.

1849. "AN ACT *appropriating the revenues of the Literature and United States deposite fund*," contains the following, among other appropriations to colleges and academies: "To the St. Lawrence Academy, two thousand dollars." *Statutes*, p. 433.

1851. "AN ACT *making an appropriation for the St. Lawrence Academy, discharging a mortgage upon its academy buildings held by this state, on which is due an arrearage of interest*," appropriates out of any moneys not otherwise appropriated "four hundred and seventy-three dollars and nineteen cents, ... in full satisfaction and discharge of a mortgage held by the state upon the academy buildings of the St. Lawrence Academy, and belonging to the common school fund, which moneys hereby appropriated shall be paid into the common school fund." *Statutes*, p. 967.

1857. "AN ACT *for the relief of the St. Lawrence Academy.*"

* * * * * * * *

"The board of supervisors of the county of St. Lawrence are hereby authorised and required at their next annual meeting, to cause to be raised, levied, and collected by tax upon the inhabitants of the town of Potsdam, in said county, in the same manner in which the other taxes of the said town shall be raised and collected, the sum of fifteen hundred dollars, and when collected, to be paid over to the treasurer of St. Lawrence academy, for the use of said institution, for refitting and improving the buildings and premises of said academy." *Statutes*, p. 20.

STATUTES INCORPORATING ACADEMIES.

1817. The first legislative act incorporating an academical institution, viz., the Clinton Grammar School, was passed March 28, 1817; prior to which time the Regents of the University had incorporated forty academies, under the authority vested in that Board by the Legislature.

The following copy of the act above referred to will serve as a specimen of numerous statutes subsequently enacted for similar purposes:

CLINTON GRAMMAR SCHOOL.

1817. "AN ACT *to incorporate the Clinton grammar school.*

"WHEREAS Salmon Butler and others have, by their petition, represented to the legislature, that they have associated together and erected a building in the town of Paris and county of Oneida, for the use of a grammar school, and have prayed for an act of incorporation—Therefore,

I. BE *it enacted* [etc.], That Asahel S. Norton, Joel Bristol, Jesse Curtis, Seth Hastings, junior, and Isaac Williams, and their successors in office, be and they are hereby constituted and declared to be a body politic and corporate, in fact and in name, by the name of the trustees of the Clinton grammar school, and by that name they and their successors shall and may forever hereafter have continual succession, and be capable in law of suing and being sued, impleading and being impleaded, answering and being answered unto, defending and being defended, in all courts and places whatsoever, in all manner of actions, suits and causes whatsoever; and may have a common seal, and change the same at pleasure; and may hold, receive, purchase, have and possess real and personal estate, and at pleasure sell and dispose of the same, for the sole and only use of the said grammar school.

II. *And be it further enacted*, That there shall be five trustees to manage the concerns of said corporation, any three of whom shall be a quorum for the transaction of business; and that the five persons last aforesaid named, shall continue trustees until others are chosen in their stead; and that when any vacancy or vacancies shall happen in the office of trustees, by death, resignation or removal from the town of Paris aforesaid, such vacancy or vacancies shall be supplied by appointment of some person or persons residing in said town, under the hands of the remaining trustees and their corporate seal.

III. *And be it further enacted*, That the said trustees and their successors shall have power to appoint such and so many officers, instructors and agents, as they, or a majority of them, may think proper, for the conducting and managing the school, property and concerns of the said corporation, and to make all such by-laws, rules and regulations as they or a majority of them may think proper for the well ordering of the same, and for the election of trustees, by the persons who have contributed, or may contribute, towards the funds and property of said corporation: *Provided however*, That such by-laws, rules and regulations, shall not be inconsistent with the intent of this act, the constitution and laws of this state or of the United States: *And provided further*, That the legislature may, at any time, add to, alter and amend the provisions of this act." *Statutes*, p. 110.

"AN ACT *to incorporate the members of the New York Institution for the Instruction of the Deaf and Dumb*," passed April 15, 1817, concludes with this section:

"VI. *And be it further enacted*, That this act be and is hereby declared a public act, and that the same be construed in all courts and places benignly and favorably, for every humane and benevolent purpose. *Statutes*, p. 306.

1819. "AN ACT *to incorporate a Female Academy in the village of Waterford*," includes the following section:

"VII. And be it further enacted, That this act shall be and is hereby declared to be a public act, and shall be construed benignly and favorably for every beneficial purpose hereby intended, nor shall

any non user of the privileges granted hereby to the said corporation create or produce any forfeiture of the same, and no misnomer of the said corperation,* in any deed, will or testament, grant, gift, demise, or other instrument, contract or conveyance, shall defeat or vitiate the same: *Provided* the corporation be sufficiently described to ascertain the intention of the parties. *Statutes*, p. 61.

From the years 1819 to 1830 inclusive, forty-one Academies and similar institutions of learning were incorporated by the Legislature, and twenty-eight of these acts of incorporation are expressly declared to be public acts, generally in the precise language of the section last quoted above. The names of these twenty-nine institutions are:

1819. WATERFORD FEMALE ACADEMY.

1820. CATSKILL FEMALE SEMINARY. *Statutes*, p. 87.

1820. MOUNT PLEASANT ACADEMY. *Statutes*, p. 90.

1821. ALBANY FEMALE ACADEMY. *Statutes*, p. 43.

1822. NEWTOWN FEMALE ACADEMY. *Statutes*, p. 59.

1822. COOPERSTOWN FEMALE ACADEMY. *Statutes*, p. 178.

1823. ITHACA ACADEMY. *Statutes*, p. 93.

1823. REDHOOK ACADEMY. *Statutes*, p. 413.

1824. KINDERHOOK ACADEMY. *Statutes*, p. 169.

1824. JEFFERSON ACADEMY. *Statutes*, p. 378.

1825. SEMINARY OF THE GENESEE CONFERENCE (since ONEIDA CONFERENCE, and now CENTRAL N. Y. CONFERENCE SEMINARY). *Statutes*, p. 125.

1825. ONTARIO FEMALE SEMINARY. *Statutes*, p. 239.

1826. BRIDGEWATER ACADEMY. *Statutes*, p. 96.

1826. BEDFORD ACADEMY. *Statutes*, p. 101.

1826. CANAJOHARIE ACADEMY. *Statutes*, p. 155.

1826. RENSSELAER OSWEGO (now MEXICO) ACADEMY. *Statutes*, p. 158.

1826. OVID ACADEMY. *Statutes*, p. 164.

1827. LIVINGSTON COUNTY HIGH SCHOOL (now GENESEO ACADEMY). *Statutes*, p. 50.

1827. SPRINGVILLE ACADEMY (now GRIFFITH INSTITUTE). *Statutes*, p. 66.

1827. GAINES ACADEMY. *Statutes*, p. 300.

1827. FLUSHING INSTITUTE. *Statutes*, p. 360.

1827. BUFFALO HIGH SCHOOL ASSOCIATION. *Statutes*, p. 369.

1828. ALBANY FEMALE SEMINARY. *Statutes*, p. 221.

1828. ROCHESTER INSTITUTE OF GENERAL EDUCATION. *Statutes*, p. 375.

* So spelled in the Statute.

1828. WHITE PLAINS ACADEMY. *Statutes*, p. 377.

1829. PALMYRA HIGH SCHOOL. *Statutes*, p. 157.

1829. BROOKLYN COLLEGIATE INSTITUTE FOR YOUNG LADIES. *Statutes*, p. 344.

1830. ONTARIO HIGH SCHOOL. *Statutes*, p. 119.

The Revised Statutes, which went into full effect in 1830, made general provisions applicable to all corporations, and a clause referring to these provisions occurs in many of the subsequent acts incorporating academies, seemingly in place of the disused section "That this act be and hereby is declared a public act," etc.; as above cited.

LOWVILLE ACADEMY.

1818. One of the lots, of 640 acres, reserved by law within the ten townships located on the St. Lawrence, was directed to be granted by letters patent to the trustees of Lowville Academy; and it was made the duty of the trustees to apply the interest arising from the sale thereof in the manner stated above with reference to Pompey Academy, in 1813, (investing the principal, and applying the income to the maintenance of instruction). *Statutes*, p. 123.

1824. "AN ACT *for the relief of the Trustees of the Lowville Academy*," authorized the commissioners of the land office to sell lots reserved for literary purposes "sufficient to raise the sum of three thousand dollars, and to pay the same to the Trustees of the Lowville academy, for the use of that institution: *Provided*, that the comptroller, before drawing his said warrant, shall be satisfied that the said trustees shall have erected and completed, on ground owned by them in fee and free of incumbrance, a substantial brick or stone building for an academy, of the value of at least eight thousand dollars." (This provision was also enacted a year later, in the case of the St. Lawrence Academy, above cited, p. 211.) *Statutes*, p. 336.

1828. "AN ACT *for the relief of Lowville Academy*," authorized the trustees "to apply the whole avails of lot number fifty-six, in the town of Canton, in the county of St. Lawrence, to the payment of the debts owing by them, and which were contracted by them for the erection and completion of their academic buildings, notwithstanding any condition in the act granting the aforesaid lot to the use of the said academy." *Statutes*, p. 43.

1836. "AN ACT *to provide for the rebuilding of the Lowville Academy*" directs that "the treasurer, on the warrant of the comptroller, shall, out of any money in the treasury belonging to the capital of the common school fund, pay the sum of two thousand dollars to the trustees of the Lowville academy, in the town of Lowville, in the county of Lewis, to be by them expended in the rebuilding of the

principal building belonging to said academy; which said sum of two thousand dollars shall be charged in the books of the comptroller as a debt due from the said town of Lowville to this state, with interest thereon at the rate of six per cent per annum; and the said debt shall belong to the common school fund."

The act further authorizes and requires the supervisors of Lewis county, at their annual meeting in each year, for five years, "to cause to be levied and collected from the taxable inhabitants of the aforesaid town of Lowville, over and above all expenses of collecting the same, the sum of five hundred dollars, and the interest at the rate aforesaid, which may be due on the first day of February then next ensuing, upon so much of the principal sum of two thousand dollars as shall then remain unpaid; .... and, when so collected, one hundred dollars thereof shall be paid to the trustees of the said Lowville academy, for the purposes aforesaid; and the residue thereof shall be paid over to the treasurer of the said county of Lewis,".... who shall "pay the same into the treasury of this state; and, upon such payment being made, the same shall be an extinguishment of so much of the said debt so as aforesaid charged to the said town of Lowville." *Statutes*, p. 82.

1841. The provisions of the above act were extended as to time. *Statutes*, p. 249.

WASHINGTON ACADEMY.

1819. "AN ACT for the Relief of the Trustees of the Washington Academy." This act recites that "the trustees of Washington Academy, situate in the town of Salem, in the county of Washington, have sustained heavy losses, by having two edifices, together with the apparatus and libraries belonging thereto, destroyed by fire."

The act, therefore, appropriates to said trustees, "out of any moneys not otherwise appropriated, three thousand dollars, for the purpose of enabling them to rebuild said academy, and also to supply the same with suitable apparatus and library;" for the faithful discharge of which trust they are to account to the comptroller. *Statutes*, p. 62.

MONTGOMERY ACADEMY.

1819. "AN ACT *to enable the trustees of the Montgomery Academy to erect a new building*," granted to the trustees of Montgomery Academy the quit-rents, including the commutation for future quit-rents, on sundry patents containing an aggregate of 19,000 acres of land; but no direction is given in the body of the act as to the manner in which the proceeds are to be applied. *Statutes*, p. 149.

1822. "AN ACT *for the relief of the Trustees of Montgomery Academy*" appropriates $737.82 to the trustees, in full satisfaction of

their claims (for quit-rents) under the above act of 1819. *Statutes*, p. 43.

1827. "The trustees of Montgomery Academy, in the town of Montgomery, and their successors in office, shall be the trustees of school district number seven in said town," * * *Statutes*, 50*th sess.*, p. 336.

DELAWARE ACADEMY.

1819. "AN ACT *concerning an Academy in the county of Delaware*," provided that the sum of six thousand dollars, paid into the treasury of this State, from the proceeds of a tract of land forfeited by attainder, be appropriated to the Regents of the University, to be by them applied toward the endowment of an academy in the village of Delhi, Delaware county. *Statutes*, p. 218.

1821. The "Supply Bill" appropriated $681, in lieu of quit-rents supposed to be due on the George Murray patent of 4,000 acres, "from which the said patent had been totally discharged by reason of a former confiscation and sale." *Statutes*, p. 266.

1849. "The treasurer shall pay, on the warrant of the comptroller,

1. To the Delaware academy, for each of the years one thousand eight hundred and forty-nine and one thousand eight hundred and fifty, the sum of two hundred and eighty-nine dollars and fifty cents, being the interest, at six per centum, on four thousand, eight hundred and twenty-five dollars of state stock held by the comptroller, in trust for said academy, being part of an appropriation for said academy, by chapter one hundred and seventy, of the laws of one thousand eight hundred and nineteen." *Statutes*, p. 433.

1851. This provision was renewed for the years 1850 and 1851. *Statutes*, p. 992.

INCREASE OF THE LITERATURE AND COMMON SCHOOL FUNDS.*

1819. "AN ACT *concerning Quit-Rents, and to increase the Literature and School Funds, respectively*," provided, "That one moiety of all the quit-rents, and commutation for future quit-rents, which may be received into the treasury, shall be and the same are hereby appropriated to the increase of the literature fund; and the other moiety thereof to the further increase of the school fund; .... the one moiety thereof in the name of the regents of the university, to be held in trust by them for the promotion of literature; and the other moiety thereof in the name of the comptroller of this state, for the time being, to be held in trust by him for the benefit of the school fund; * * *Statutes*, p. 298.

* For a report made by the Regents of the University, April 2, 1819, showing the funds and revenues of the Regents at that date, and the "fund for the promotion of literature" created by the Statue of 1813, see *Senate Journal*, 42d session, 1819, pp. 245-247.

1827. "AN ACT *to provide permanent funds for the annual appropriation to Common Schools, to increase the Literature Fund, and to Promote the Education of Teachers*," directs, in regard to the increase of the Literature Fund, "that the comptroller be and he is hereby authorised to receive any bonds and mortgages taken, or that shall hereafter be taken, on the sale of any lands belonging to canal fund, to the amount of one hundred and fifty thousand dollars, in payment for so much of the canal stock owned by this state, belonging to the general fund, and thereupon to cancel and discharge the like amount of the said canal stock, and the bonds and mortgages when so received, and the sum of one hundred and fifty thousand dollars of the said canal stock, until the said bonds and mortgages are received, shall be appropriated and transferred to the literature fund of this state, and the income thereof shall be subject to the control of the regents of the university, upon condition or in addition to any other condition the regents may prescribe, that the said regents shall annually distribute the whole income arising from the fund now under their control, as well as that hereby added, among the incorporated academies and seminaries of this state, other than colleges, which are subject to the visitation of the said regents." * * * * * *Statutes*, p. 237.

1830, 1831, 1832. Certain transfers of stocks were directed to be made, not materially affecting the status of the Literature Fund. *Statutes*, 1830, p. 207; 1831, p. 350; 1832, p. 510.

1832. "AN ACT *for the improvement of the Literature Fund*," directs that "the regents of the university shall, within sixty days after the passage of this act, transfer to the comptroller all the stock, money, securities and property belonging to the literature fund in their possession, or under their control;" and, further, provides for the application of the income arising from said fund to the same general purposes as before. *Statutes*, p. 10.

FARMERS' HALL ACADEMY.

1822. The Trustees of Farmers' Hall Academy, in the village of Goshen, were constituted the trustees of the common school district comprising the said village, provided, the consent of a majority of the taxable inhabitants of the district should be obtained, for the term of six years only, unless by renewal of such consent for the same period, from time to time. *Statutes*, p. 196.

OYSTER BAY ACADEMY.

1823. By a like provision of law, the trustees of Oyster Bay Academy were conditionally made the trustees of the local common school. *Statutes*, p. 170.

Middlebury Academy.

1823. The commissioners of the land office were authorized to raise one thousand dollars for the benefit of the Middlebury Academy, from the sale of lots reserved for literary purposes. *Statutes*, p. 45.

1826. The sum of $1,000 was appropriated in advance for and in lieu of that provided for in 1823, the said trustees being required to give a penal bond to make up any deficiency in the amount raised by the sale of lots reserved for literary purposes. *Statutes*, p. 177.

Mount Pleasant Academy.

1824. "AN ACT *for the benefit of the Mount Pleasant Academy*," directed the comptroller to grant to the trustees of said academy a certain bond and mortgage, with all the rights appertaining to the people of the State of New York thereto. *Statutes*, p. 330.

Red Hook Academy.

1824. "AN ACT *making an appropriation for the Red Hook Academy*" granted $1,000, to be raised from the sale of lots reserved for the literature fund, to the trustees of the Red Hook academy, for apparatus, library, etc.; for the faithful discharge of which trust, the said trustees were to account to the comptroller. *Statutes*, p. 375.

Fredonia Academy.

1825. "AN ACT *for the Relief of Fredonia Academy*," granted an annuity of $350 for five years, to be applied "towards the payment of a salary to a competent preceptor of said academy;" and provided "that the trustees shall annually report and account to the regents of the university for the application of the said monies." *Statutes*, p. 349.

Auburn Academy.

1825. Letters patent were directed to be issued to the trustees of the Auburn Academy, for lot No. 88, less fifty acres, in the township of Sterling. *Statutes*, p. 387.

1826. The sum of $1,002 was appropriated in exchange for the above lot. *Statutes*, p. 100.

Ithaca Academy.

1825. The treasurers of Seneca and Tompkins counties were authorized to sell lot No. 24, in the town of Ulysses, and apply one-half the proceeds to Ithaca Academy, and to preserve one-half for the benefit of such academy in Seneca county as the legislature should thereafter direct. *Statutes*, p. 428.

LEWISTON ACADEMY.

1826. "AN ACT *relative to the Ferry on the Niagara River, at Lewiston*," directed the commissioners of the land office to lease the said ferry and lot appertaining thereto, for a term of ten years, to the trustees of Lewiston Academy, for the sole use and benefit of said academy. *Statutes*, p. 301.

1833, 1843. The above lease was renewed for the term of ten years from each of the foregoing dates. *Statutes*, 1833, p. 114; 1843, p. 89.

MEXICO (formerly RENSSELAER OSWEGO) ACADEMY.

1828. "AN ACT relative to the Rensselaer Oswego Academy," declares that "the site of the Rensselaer Oswego Academy is hereby located on a lot of land in the town of Mexico, in the county of Oswego, which was conveyed on the twentieth day of March, one thousand eight hundred and twenty-two, by Roswell L. Colt, to Dennis Peck, Leonard Ames, and William S. Fitch, trustees of school district number five, in said town of Mexico." *Statutes*, p. 124.

1829. "It shall and may be lawful for the trustees, for the time being, of school district number five, in the town of Mexico, in the county of Oswego, to convey by a good and sufficient deed of conveyance, to the trustees of the Rensselaer Oswego academy, or their successors in office, the land which was conveyed (as stated in the act of 1828), together with all and singular the buildings, appurtenances and privileges to the same belonging or in any wise appertaining." *Statutes*, p. 83.

1856. "AN ACT *authorizing the Comptroller to loan money to the Mexico Academy, and for other purposes*," allowed the inhabitants of the town of Mexico, at a town meeting, to vote for or against the proposed loan; and in case of a majority vote in favor of such loan, "the comptroller is hereby authorized to loan to the trustees of the said Mexico academy, from the capital of the common school fund, a sum of money not to exceed the sum of one thousand five hundred dollars, to be paid in three annual installments, next following the making of such loan, with interest annually upon the whole sum remaining unpaid; and such loan, when made, shall be a debt of the said town of Mexico, to be assessed, levied and collected on the taxable property of said town, as hereinafter provided." * * * *Statutes*, p. 171.

FRANKLIN ACADEMY (Prattsburgh).

1828. "AN ACT for the Relief of Franklin Academy."

"The treasurer shall pay, on the warrant of the comptroller, to the trustees of the Franklin Academy, in the county of Steuben, the sum of two thousand dollars, out of the first money that shall be received into the treasury on account of the debt due the people of this state

from George McClure; the said sum to be applied by the said trustees to the purchase of philosophical apparatus, and a library suitable for the said academy; but this act shall not entitle the said trustees to any money out of the treasury, unless it shall be received from the debt above mentioned." *Statutes*, p. 298.

OGDENSBURGH ACADEMY.

1833. AN ACT *authorising the board of supervisors of the county of St. Lawrence to lay a tax on the town of Oswegatchie, to be invested in an academy and lot, and for other purposes*," appoints "commissioners for expending and laying out the monies raised and appropriated by this act;" directs that "the money now in the hands of the supervisor and poor-masters of the town of Oswegatchie, or the securities therefor, shall be paid or delivered over into the hands of the [said] commissioners;" and provides for levying and collecting upon the taxable property of said town, such sum as, with the sum to be received from the said supervisor and poor-masters, shall amount to two thousand dollars: *Provided*, that the inhabitants of the village of Ogdensburgh shall first have raised, by subscription or otherwise, the sum of two thousand dollars for the same purpose. The said moneys are further directed to be applied to the purchase of a lot, and the purchase or erection of suitable buildings for an academy, etc., including a room for public meetings of the inhabitants; and certain town and village officers are made trustees, ex officio, of such academy. It is also directed, among other things, that the amount of said $2,000 tax for each school district of the town be ascertained, and that the inhabitants of each school district of said town, outside of the village of Ogdensburgh, "shall annually be entitled to a credit on the tuition of any scholars from such district, attending any course of instruction in the said academy during the said year, to the amount of the interest on the sum so determined to have been paid or to belong to the said district." *Statutes*, p. 353.

1834. "AN ACT *in addition to an act entitled*" (as above), authorizes certain ex officio trustees of the Ogdensburgh Academy, for the term of ten years, to grant licenses to keep a ferry across the St. Lawrence river, the net rents, profits and income of which shall inure to and belong to the said Ogdensburgh Academy. *Statutes*, p. 220.

1844. The foregoing franchise was renewed for the term of ten years. *Statutes*, p. 53.

CANTON ACADEMY.

1835. "AN ACT *authorising the supervisors of the county of St. Lawrence to levy a tax for the benefit of a classical school in the*

town of Canton, heretofore known as the Canton Academy," provided for raising the sum of five hundred dollars, to be securely invested, and the interest to be applied to the support of said classical school. *Statutes*, p. 282.

1837. Renewed, as to amount, for each of three successive years, provided an amount equal to the whole sum raised by taxation shall have been raised by individuals for the same object, or the income of such sum shall have been secured for a term of at least twenty years. *Statutes*, p. 139.

1842. The act of 1837 was amended and renewed so far as to allow the last five hundred dollars to be collected during two then subsequent years, and "to be applied in payment of debts incurred by Canton Academy, for the erection of academic buildings." *Statutes*, p. 367.

DISTRIBUTION OF THE LITERATURE FUND.

1834. "AN ACT *relating to the distribution and application of the revenues of the literature fund.*"

§ 1. There shall be twelve thousand dollars of the revenues of the literature fund annually distributed, by the regents of the university, to the academies and schools which now are or hereafter may be subject to the visitation of the regents, in the manner now provided by law; which moneys shall be exclusively appropriated and expended by the trustees of such academies and schools respectively, towards paying the salaries of tutors.

§ 2. Any portion of the excess of the literature fund over the sum of twelve thousand dollars, may, in the discretion of the regents, be assigned to any academy or school subject to their visitation, and subject to such rules and regulations as they may prescribe, for the purchase of text books, maps and globes, or philosophical or chemical apparatus; such sum shall not exceed two hundred and fifty dollars in any one year. But no part of the said excess shall be actually paid over, unless the trustees of the academy or school to which it is to be appropriated shall raise and apply an equal sum of money to the same object. *Statutes*, p. 176.

§ 3. The fifty-fourth section of chapter fifteen of title one of the first part of the Revised Statutes, is hereby repealed. [The section thus repealed was: "Any college or academy now incorporated, and exempt from the visitation of the regents, may subject itself to such visitation, by a resolution, to be approved and signed by a majority of its trustees, and attested by the seal of the corporation; and every such resolution, when received by the regents, shall be unalterable, unless with the consent of the regents." 1 *R. S.*, p. 164.]

EDUCATION OF COMMON SCHOOL TEACHERS.

1834. "AN ACT *concerning the Literature Fund*," directs:

§ 1. The revenue of the literature fund now in the treasury, and the excess of the annual revenue of said fund hereafter to be paid into the treasury, over the sum of twelve thousand dollars, or portions thereof, may be distributed by the regents of the university, if they shall deem it expedient, to the academies subject to their visitation, or a portion of them, to be expended as hereinafter mentioned.

§ 2. The trustees of academies to which any distribution of money shall be made by virtue of this act, shall cause the same to be expended in educating teachers of common schools, in such manner and under such regulations as said regents shall prescribe. *Statutes*, p. 425.

1849. "AN ACT *making appropriations for the support of common schools for the years* 1849 *and* 1850," provides, among other things:

§ 2. The treasurer shall pay on the warrant of the comptroller out of the income of the United States deposite or Literature Funds, not otherwise appropriated to the trustees of one or more academies, as the regents of the university shall designate, in each county in this state, the sum of two hundred and fifty dollars per year for the years one thousand eight hundred and fifty and one thousand eight hundred and fifty-one; provided such academy or academies shall have instructed in the science of common school teaching, for at least four months during each of said years at least twenty individuals, but no such one county shall receive a larger sum than two hundred and fifty dollars. *Statutes*, p. 236.

FRANKLIN ACADEMY (Malone).

1836. "AN ACT *to provide for the rebuilding of the Franklin academy*," authorized the comptroller to loan out of the capital of the common school fund, "the sum of two thousand dollars to the trustees of the Franklin academy, in the town of Malone, in the county of Franklin, to be by them expended in the rebuilding of the academy buildings on the academy lot in said town; which said sum of two thousand dollars shall be charged in the books of the comptroller as a debt due from said town of Malone to this state, with interest thereon at the rate of six per cent per annum; and the said debt shall belong to the common school fund." To meet this indebtedness, the supervisors of said county were required to levy a tax, for each of four successive years, on the taxable inhabitants of said town of Malone, equal to one-fourth of the whole debt, including interest, etc. (See a similar act in relation to Lowville Academy, *ante*, p. 215.) *Statutes*, p. 32.

1857. "AN ACT to authorize a loan to the trustees of Franklin Academy, at Malone, Franklin county," authorized the comptroller to loan to said trustees, at seven per cent interest, "out of the capi-

tal of the common school fund, to be paid in six equal annual instalments, the sum of twelve hundred dollars, on the execution, by such trustees, of a bond and mortgage on their real property, as the comptroller shall deem ample security, or the deposit of such other security as the comptroller shall deem sufficient." A satisfactory policy of insurance on the academy buildings, duly assigned, was also required as further security. *Statutes, vol.* 2, p. 403.

SANDY HILL ACADEMY.

1836. "AN ACT *to provide for the building of an academy or high school in the village of Sandy Hill,*" authorized the levying a tax upon the said village not exceeding three thousand dollars, for this purpose. *Statutes*, p. 790.

FURTHER INCREASE OF LITERATURE AND COMMON SCHOOL FUNDS, FROM THE U. S. DEPOSIT FUND.

1838. "AN ACT *to appropriate the income of the United States deposite fund to the purposes of education and the diffusion of knowledge,*" directs that the sum of one hundred and ten thousand dollars be annually distributed from that fund to the common schools; the sum of fifty-five thousand dollars annually for the purchase of district libraries, for the term of three years, and thereafter for either libraries or teachers' wages, in the discretion of the inhabitants of each district; six thousand dollars each, annually, for five years, and until otherwise directed by law, to Geneva College, and the University of the City of New York, for the payment of professors and teachers; three thousand dollars annually for the same period and purpose, to Hamilton college; and twenty-eight thousand dollars annually "to the literature fund, which, together with the sum of twelve thousand dollars of the present literature fund, shall be annually distributed among the academies in the several senatorial districts by the regents of the university, in the manner now provided by law. But no academy shall hereafter be allowed to participate in the annual distribution of the literature fund, until the regents of the university shall be satisfied that a proper building has been erected and finished to furnish suitable and necessary accommodation for such school, and that such academy is furnished with a suitable library and philosophical apparatus, and that a proper preceptor has been and is employed for the instruction of the pupils at such academy:" And further, that the regents shall, on being satisfied that such building, library and apparatus are sufficient for the purposes intended, and that the whole is of the value at least of twenty-five hundred dollars, permit such academy or school to place itself under the visitation of the regents, and thereafter to share in the

distribution of the moneys above mentioned, or any other of the literature fund in the manner now provided by law. The regents of the university may also admit to such distribution and to any other of the literature fund, any incorporated school, or school founded and governed by any literary corporation other than theological or medical, in which the usual academic studies are pursued, and which shall have been in like manner subjected to their visitation, and would in all other respects, were it incorporated as an academy, be entitled to such distribution.

"§ 9. It shall be the duty of the regents of the university to require of every academy receiving a distributive share of public money under the preceding section equal to seven hundred dollars per annum, to establish and maintain in such academy a department for the instruction of common school teachers, under the direction of the said regents, as a condition of receiving the distributive share of every such academy."

The residue of the income of the said U. S. deposit fund not otherwise appropriated was to be annually added to the capital of the common school fund. * * * *Statutes*, p. 220.

1851. "AN ACT *appropriating the revenues of the Literature and United States Deposit Funds*," provides:

§ 1. There shall be paid annually, by the treasurer, on the warrant of the comptroller, out of the revenues derived from the literature fund, to the several academies under the supervision of the regents of the university, the sum of twelve thousand dollars, and the further sum of twenty-eight thousand dollars from the income of the United States deposit fund, being in all forty thousand dollars, according to an apportionment to be made by the regents among the said academies, in proportion to the number of pupils in each who shall have pursued the requisite studies to enable them to share in said distribution; there shall be paid to the Delaware academy in each of the years 1851 and 1852, the sum of two hundred and eighty-nine dollars and fifty cents, being the interest at six per cent, on four thousand eight hundred and twenty-five dollars of state stock held by the comptroller in trust for said academy, being part of an appropriation for said academy, by chap. 170, of the laws of 1819. * * * * *

§ 3. There shall be paid by the treasurer, on the warrant of the comptroller, out of the income of the literature fund, to the regents of the university, three thousand dollars annually, to be assigned by them to such academies, subject to their visitation, for the purchase of text books, maps and globes, or philosophical or chemical apparatus, as may apply for a part of the money for that purpose, on the terms prescribed in the second section of chapter one hundred and forty of the laws of one thousand eight hundred and thirty-four.

* * * * * * * *

§ 4. The treasurer shall pay yearly, on the warrant of the comptroller, out of the income of the United States deposit or literature

fund, not otherwise appropriated, to the trustees of one or more academies in each county of the state, as the regents of the university shall designate, the sum of twelve dollars and fifty cents for each scholar who shall have been instructed in such academy during at least four full calendar months in the science of common school teaching. *Statutes*, p. 992.

HUDSON ACADEMY.

1838. "AN ACT *for the relief of the Hudson Academy*," provides that "the comptroller of this State is hereby authorized to cancel the bond of five hundred dollars, with interest thereon, held by the people of this state, against the Hudson Academy, bearing date third March, one thousand eight hundred and thirteen." *Statutes*, p. 268.

PROVISIONS RELATIVE TO TRUST FUNDS.

1840. "AN ACT *authorizing certain trusts*," provides:

§ 1. Real and personal property may be granted and conveyed to any incorporated college or other literary incorporated institution in this state, to be held in trust for either of the following purposes:

1. To establish and maintain an observatory.
2. To found and maintain professorships and scholarships.
3. To provide and keep in repair a place for the burial of the dead; or
4. For any other specific purposes comprehended in the general objects authorized by their respective charters. The said trusts may be created, subject to such conditions and visitations as may be prescribed by the grantor or donor, and agreed to by said trustees; and all property which shall hereafter be granted to any incorporated college or other literary incorporated institution in trust for either of the aforesaid purposes, may be held by such college or institution upon such trusts, and subject to such conditions and visitations as may be prescribed and agreed to as aforesaid.

§ 2. Real and personal estate may be granted and conveyed to the corporation of any city or village of this state, to be held in trust for any purpose of education, or the diffusion of knowledge, or for the relief of distress, or for parks, gardens, or other ornamental grounds, or grounds for the purposes of military parades and exercise, or health and recreation, within or near such incorporated city or village, upon such conditions as may be prescribed by the grantor or donor, and agreed to by such corporation; and all real estate so granted or conveyed to such corporation, may be held by the same, subject to such conditions as may be prescribed and agreed to as aforesaid.

§ 3. Real and personal estate may be granted to commissioners of common schools of any town, and to trustees of any school district, in trust for the benefit of the common schools of such town, or for the benefit of the schools of such district.

§ 4. The trusts authorized by this act may continue for such time as may be necessary to accomplish the purposes for which they may be created. *Statutes*, p. 267.

1846. "AN ACT *to amend the act,*" (authorizing certain trusts as aforesaid) provides:

§ 1. The income arising from any real or personal property granted or conveyed, devised or bequeathed in trust to any incorporated college or other incorporated literary institution, for any of the purposes specified in the "Act authorizing certain trusts," passed May 14th, 1840, or for the purpose of providing for the support of any teacher in a grammar school or institute, may be permitted to accumulate till the same shall amount to a sum sufficient, in the opinion of the regents of the university, to carry into effect either of the purposes aforesaid, designated in said trust. *Statutes*, p. 76.

CAMBRIDGE WASHINGTON ACADEMY.

1848. "AN ACT *for the relief and benefit of the Cambridge Washington Academy*" provides that "all the right, title and interest of the people of this state, in and to the personal estate of Margaret McLelland, deceased, late of Washington county, a lunatic, who it is alleged died without heirs at law capable of inheriting, is hereby released to the trustees of the Cambridge Washington Academy, for the use and benefit of said academy, provided always that nothing herein contained shall be construed to impair or affect the claims of any creditor or heir at law of said Margaret McLelland." *Statutes*, p. 341.

ACADEMY OF DUTCHESS COUNTY.

1849. "AN ACT *appropriating the revenues of the Literature and United States deposite fund,*" in addition to appropriations to certain colleges, and to the Delaware and St. Lawrence Academies, appropriates "to the Dutchess County Academy, out of the income of the United States deposite fund, four thousand dollars." *Statutes*, p. 433.

ALFRED ACADEMY.

1850. "AN ACT *authorizing a loan to the town of Alfred, in the county of Allegany, and to authorize the town of Alfred to reloan the same money to the trustees of Alfred Academy,*" provided for advancing the sum of ten thousand dollars from the capital of the common school fund, under certain specified conditions. *Statutes*, p. 496.

1851. The Annual Appropriation Act contains the following:

"From the General Fund:" [for the three next following institutions.]

RENSSELAER INSTITUTE.

"For the Rensselaer Institute [then an academy], three thousand dollars." [Subsequent appropriations have been made to the Rensselaer Polytechnic Institute, which, being now authorized to confer degrees, may be classed with colleges.]

GENESEO ACADEMY.

"For Geneseo academy, three thousand dollars."

GOUVERNEUR WESLEYAN SEMINARY.

"To the Gouverneur Wesleyan seminary, two thousand dollars." *Statutes*, p. 936.

NEW PALTZ ACADEMY.

1856. "AN ACT *for the loaning of certain moneys to the New Paltz Academy, at New Paltz, Ulster county*," provides:

§ 1. The comptroller is authorized to loan to the trustees of New Paltz Academy, the sum of one thousand dollars from the literature fund for the period of six years, upon said trustees filing satisfactory securities for the payment of the same by mortgage on the real estate belonging to said academy, situate in the village of New Paltz, Ulster county.

§ 2. The sum of money hereby authorized to be loaned shall be applied by such trustees solely for the benefit of such academy.

§ 3. The interest upon the sum hereby authorized to be loaned shall be paid annually. *Statutes*, p. 169.

1863. "AN ACT for the relief of New Paltz Academy," released the aforesaid loan of one thousand dollars with accrued interest, and appropriated from the general fund a sum sufficient to reimburse the literature fund therefor. *Statutes*, p. 826.

LOANS TO ACADEMIES.

1857. During this year, the Legislature authorized the Comptroller to loan money from the common school fund to several of the academies, to wit:

ANTWERP LIBERAL LITERARY INSTITUTE, $3,000. *Statutes*, vol. ii, p. 473.

FRANKLIN ACADEMY, Malone, $1,500. Vol. ii, p. 403. (See p. 223, *ante*.)

ONONDAGA ACADEMY, $4,000. Vol. ii, p. 496. (See p. 210, *ante*.)

OVID ACADEMY, $5,000. Vol. ii, p. 492.

ROGERSVILLE UNION SEMINARY, $3,500. Vol. i, p. 845.

SUSQUEHANNA SEMINARY, $15,000. Vol. ii, p. 495.

Olean Academy.

1857. The town of Olean was authorized to raise $1,500 by tax, on a two-thirds vote by the taxable inhabitants, the said sum to be expended in completing the said academy and buildings thereto belonging. *Statutes*, vol. i, p. 904.

Aurora Academy.

1864. The town of Aurora, Erie county, was authorized to raise six thousand dollars by bond, to be expended in rebuilding the said academy, and the Comptroller was authorized to make a loan from the common school fund on such bond. *Statutes*, p. 1318.

1868. Fifteen hundred dollars, in addition to the above, for completing and furnishing the building and paying off the indebtedness of said institution. *Statutes*, p. 533.

Utica Academy.

1866. Common Council authorized to raise $25,000 by bonds, to be applied to the erection of a new building, etc. *Statutes*, p. 26.

1868. Ten thousand dollars, in addition to the above. *Statutes*, p. 41.

Le Roy Academic Institute.

1867. Town authorized, on a majority vote at the annual town meeting, to raise $10,000, upon its bonds, for benefit of institute, the acting supervisor to be, after delivery of bonds, from that time forward, a trustee by virtue of his office. *Statutes*, p. 84.

Canajoharie Academy.

1867. Village trustees authorized to levy tax of $2,500, to pay indebtedness of said academy and to improve property. *Statutes*, p. 833.

Arcade Academy.

1867. Town authorized to issue bonds to the amount of $8,000, for liquidation of debt, erection of boarding-house, and improvement of buildings and grounds. *Statutes*, p. 2381.

Almond Academy.

1868. Town authorized, on a majority vote of electors, to raise $7,000 by bonds, for erecting an Academy and town hall. *Statutes*, p. 199.

WOODHULL ACADEMY.

1869. The Supervisor of Woodhull was authorized, on the consent of a majority of the tax-payers of said town, to issue bonds upon the credit of the town to the amount of $4,000, for the purpose of erecting additional buildings for the use of said Academy. *Statutes*, p. 424.

FRIENDSHIP ACADEMY.

1871. Supervisor of Friendship authorized, on a majority vote of electors, to issue bonds to the amount of $3,000, for addition to building, repairs and improvements. *Statutes*, p. 269.

1873. Similar enactment for $4,000 more. *Statutes*, p. 1181.

CHRISTIAN BROTHERS' ACADEMY, ALBANY.

CARY COLLEGIATE SEMINARY.

1871. "AN ACT making appropriations for certain public and charitable institutions," contains the following grants to academies, subject to the visitation of the Regents of the University:

"For the Christian Brothers' Academy at Albany, three thousand seven hundred and fifty dollars."

"For the Cary Collegiate Seminary, Oakfield, three thousand seven hundred and fifty dollars." *Statutes*, p. 1966.

ROCHESTER FREE ACADEMY.

1872. The city was authorized to issue bonds to the amount of $75,000, "to be expended in the erection of a free academy upon the site purchased and now owned by said city for such purpose." *Statutes*, p. 471.

Also, for $15,000, to pay debt incurred in the purchase of a site for said free Academy. *Statutes*, p. 541.

1873. $75,000 above, increased to $125,000. *Statutes*, p. 1060.

UNADILLA ACADEMY.

1872. "AN ACT to provide for the endowment of the Unadilla academy" authorizes an appropriation of $10,000 of the surplus moneys in the hands of the railroad commissioners of said town, for which surplus money said town has incurred no liability, on the consent of a majority of the tax-payers of said town, owning or representing more than one-half of the taxable property, to be set apart as a fund, the income of which shall be applied exclusively toward the

payment of the salaries of teachers employed by the trustees of the said Unadilla Academy. *Statutes*, p. 1149.

Cortland Academy.

1867. The town officers of Homer were authorized, on a two-thirds vote of electors, to raise $20,000 by bond, for erection of new building for Cortland Academy. *Statutes*, p. 224.

1873. AN ACT to provide for the payment of tuition in Cortland Academy of academic scholars residing in the village of Homer."

Section 1. Every scholar residing within the corporate limits of the village of Homer, who has received or who may hereafter receive the regents' certificate, entitling such scholar to admission in the academies of this State, shall be entitled to tuition, free of charge, in Cortland Academy, in the village of Homer, for the full academic course of instruction as established by the trustees of said academy.

§ 2. To pay the expenses of tuition of all scholars who receive instruction in Cortland Academy pursuant to section one of this act, the trustees of the village of Homer are hereby authorized and required to levy a tax upon the taxable property of said village, sufficient to pay the tuition of such scholars, at the rate of nine dollars a term of thirteen weeks, for all scholars who are pursuing studies known as higher English, and at the rate of twelve dollars a term of thirteen weeks, for all scholars who are pursuing classical studies in said academy.

§ 3. After the close of each academic term in said academy, it shall be the duty of the principal of said academy to report, to the president of the board of trustees of said village, the name of each academic scholar residing in said village of Homer, who has received instruction in said academy during the previous term, with the number of weeks each has been in attendance, and the studies pursued by each, which report shall be verified by the affidavit of said principal.

§ 4. It shall be the duty of the president of the board of trustees of said village of Homer, within ten days after receiving the report mentioned in the preceding section, to lay the same before the board of trustees of said village, at a regular or special meeting of such board, whose duty it shall be to draw an order on the treasurer of said village, payable to the treasurer of said Cortland academy, for the amount which said academy is entitled to receive, as shown by the report of said principal of Cortland academy, which order shall be delivered to the treasurer of Cortland academy.

§ 5. It shall be the duty of the secretary of the board of trustees of said academy to give notice, in one or more papers published in the village of Homer, at least two weeks before the holding of the regents' examination in each term of said academy; and any scholar residing within the limits of said village shall be allowed all the privileges of an examination granted to scholars attending said academy.

§ 6. Nothing in this act, giving free tuition to scholars in Cortland academy, shall be construed so as to interfere with the discipline of said school; and it shall be lawful for the board of trustees of said academy, on recommendation of the principal of said academy, to expel any scholar for improper conduct.

§ 7. All acts and parts of acts inconsistent with this act are hereby repealed.

§ 8. The said board of trustees of the village of Homer shall take no steps in pursuance of the provisions of this act until the same shall be approved by a majority of voters of said village voting at a special meeting held for that purpose, in the town hall in the said village of Homer on the first Tuesday of May next. A notice of which special meeting shall be published in two papers published in said village for two weeks previous to such election. Said vote shall be taken by ballot, and there shall be written or printed or partly written and partly printed on the ballots of those in favor of the tax, "For the payment of tuition of academic scholars in Cortland academy;" and on the ballots of those opposed, "Against the payment of tuition of academic scholars in Cortland academy." The poll shall be open from one o'clock in the afternoon until seven o'clock in the evening. The trustees of said village shall preside at and certify the result of such meeting; and such certificate shall be recorded by the clerk of said village in the village record.

§ 9. This act shall take effect immediately. *Statutes*, p. 255.

STATE TAX FOR THE BENEFIT OF ACADEMIES AND ACADEMICAL DEPARTMENTS OF UNION SCHOOLS.

1872. The Annual Appropriation Act contains the following paragraph:

"For the benefit of the academies and academical departments of the union schools, the sum of one hundred and twenty-five thousand dollars, or so much thereof as may be derived from a tax of one-sixteenth of one mill upon each dollar of the taxable property of the State; the sum thus arising to be divided as the literature fund is now divided, which is hereby ordered to be levied for each and every year." *Statutes*, p. 1250.

1873. The Annual Appropriation Act renews the appropriation of 1872, with this modification of the clause following the word "State," to wit: "this sum to be divided as the literature fund is now divided, and in accordance with the law passed in eighteen hundred and seventy-two; but no part of this fund shall be distributed in aid of any religious or denominational academy of this State." *Statutes*, p. 1007.

The language used in the final clause of this paragraph differs from that which occurs in § 7, of the following statute:

Free Instruction, Mode of Distribution, etc.

1873. "AN ACT in relation to academies and academical departments of union schools, and the distribution of public funds."

Section 1. The sum of one hundred and twenty-five thousand dollars, ordered by chapter five hundred and forty-one of the laws of eighteen hundred and seventy-two, to be levied for each and every year, for the benefit of academies and academical departments of union schools, shall be annually distributed by the regents of the university, for the purposes and in the manner following, that is to say:

§ 2. Three thousand dollars or so much thereof as may be required, in addition to the annual appropriation of three thousand dollars for the same purpose from the literature fund, for the purchase of books and apparatus, to be annually apportioned and paid in the manner now provided by law.

§ 3. Twelve thousand dollars, or so much thereof as may be required in addition to the annual appropriation of eighteen thousand dollars from the United States Deposit fund, for the instruction of common school teachers; the whole sum to be apportioned and paid to the several institutions which may give such instruction as now provided by law, at the rate of fifteen dollars for each scholar instructed in a course prescribed by the said regents, during a term of thirteen weeks, and at the same rate for not less than ten weeks or more than twenty weeks.

§ 4. The said regents shall cause to be admitted to the academic examination, established by them in the academies and academical departments of union schools, any common school, or free school, any scholar from any common school who may apply for such examination bearing the certificate of the principal teacher, or of any trustee of such school, that in his judgment such scholar is qualified to pass the said examination.

§ 5. Free instruction in the classics or the higher branches of English education, or both, shall be given in every academy and academical department of a union school subject to the visitation of the said regents, under such rules and regulations as the said regents may prescribe, to all scholars, in any academy and in any free school, or in any common school, who, on any examination held subsequent to the beginning of the present academic year, shall have received the certificate of academic scholarship issued by the said regents to the extent of twelve dollars, and if the condition of the fund will admit not less than twenty dollars tuition, at such rates of tuition as are usually charged for such scholars in such academies and academical departments respectively, and in case the tuition is free to resident pupils, at the rates charged to non-resident pupils, or at such rates, in all cases, as the said regents may deem reasonable; but such free instruction must be obtained by such scholars within two years from the date of their examination respectively.

§ 6. The said regents may, in their discretion and under such rules as they may adopt, annually apply a sum not exceeding twenty-five hundred dollars, in book or other premiums, for excellence in scholar

ship and conduct, as shown in the papers and the returns of the academic examination; but the cost of any one premium shall not exceed ten dollars; and the said sum of twenty-five hundred dollars, or such part thereof as may be needed, shall be paid to the said regents out of the amount referred to in the first section of this act, by the treasurer on the warrant of the comptroller.

§ 7. The balance of the said one hundred and twenty-five thousand dollars remaining after the apportionments described in the preceding sections of this act shall have been made, shall be distributed as the literature fund is now by law directed to be distributed, but no money shall be paid to any school under the control of any religious or denominational sect or society.

§ 8. The said regents of the university are hereby authorized to make such just and equitable regulations as they may deem necessary for the purposes of this act.

§ 9. The treasurer shall pay, on the warrant of the comptroller, the several sums to which the said regents may certify any institution to be entitled under the provisions of this act.

§ 10. Every academy shall make up its annual report for its academic year, and shall transmit the same to the regents on or before the first day of September in each year.

§ 11. This act shall take effect immediately. *Statutes*, p. 997.

SUMMARY OF INSTITUTIONS AND LEADING SUBJECTS.

The names of academies, etc., and the leading subjects contained in this paper, have been inserted generally in the chronological order of the first statutes relating to them respectively, an alphabetical list of which is now annexed:

GERMAN

IN THE COLLEGE CURRICULUM.

By ADOLPH WERNER,

Professor of the German Language and Literature in the College of the City of New York.

HAVING been desired to lay before the Convocation my views upon the study of German in our colleges, I beg to submit my examination-papers of the academic year just closed. These papers embody my opinion of what ought to be done, and can be done, in the way of German in an American college. I have stated upon each paper whether the students were allowed to consult the dictionary or not, and also whether the selections were from what they had read during the term or presented to them for the first time. No other explanations seem necessary.

THREE YEARS' COURSE.

First Term, or 30 Lessons in all.

EXAMINATION PAPER.

February 2, 1872.

FRESHMAN CLASS.

1. Translate (without dictionary):

(*Old matter—Glaubensklee's Reader.*)

Jetzt kam sie auf einen offenen Platz im Walde, da sah sie unter einem Baume ein Schneeglöckchen stehen, und weil sie von dem vielen Bücken und Laufen müde geworden war, setzte sie sich zu dem Glöckchen und legte ihr Reisigbündel neben sich. Als sie so dasaß und das Blümchen betrachtete, sagte sie: „Was für ein schönes, grünes Kleid du hast, liebes Schneeglöckchen, das putzt dich gar herrlich, und frieren wirst du auch nicht, wie ich armes Kind in meinem zerrissenen Kleide, und solch eine

schöne weiße Mütze, wie du hast, werde ich auch nimmermehr von der bösen Frau bekommen."

Der fremde Knabe trug ein silbernes Körbchen, und sprach mit einer holdseligen Stimme: „Komm, laß uns Beeren pflücken für deine kranke Mutter, sie wachsen dort in dem Walde." Und Wilhelm ging mit dem fremden Knaben in den nahen Wald, und sie pflückten in kurzer Zeit das Körbchen voll der schönsten reifen Erdbeeren, obgleich es noch nicht Erdbeerenzeit war; und der fremde Knabe ließ ihm das Körbchen und sprach: „Bringe diese Beeren deiner Mutter," und verschwand. Wilhelm nahm das Körbchen und brachte es seiner Mutter; sie aß von den Beeren und genas in derselben Stunde von ihrer Krankheit und herzte ihren Knaben.

In alten Zeiten wanderte einmal ein Riese auf der Landstraße. Da sprang ihm plötzlich ein unbekannter Mann entgegen, und rief: „Halt, keinen Schritt weiter!" „Was," sprach der Riese, „du willst mir den Weg vertreten? Wer bist du, daß du so keck mit mir redest?" „Ich bin der Tod," erwiederte der Andere, „mir widersteht Niemand, und auch du mußt meinen Befehlen gehorchen." Der Riese aber weigerte sich und fing an mit dem Tode zu ringen. Es war ein langer, heftiger Kampf, zuletzt aber behielt der Riese die Oberhand und schlug den Tod mit seiner Faust nieder, daß er neben einem Steine niedersank. Der Riese ging seiner Wege, und der Tod lag besiegt da und war so kraftlos, daß er sich nicht wieder erheben konnte.

2. Give the case, gender, and nominative plural of Platz, Walde, Baume, Kleid, Mütze, Frau, Knabe, Körbchen, Erdbeeren, Mutter, Mann, Hand.

3. Give the infinitive and past participle of wanderte, sprang, sprach, bist, redest, fing an, behielt, lag.

4. Give the terminations of the present and preterit indicative, of both the strong and the weak verb.

5. Write the poem Das Ständchen.

Second Term, or 60 Lessons in all.

June 13th, 1872.

FRESHMAN CLASS.

1. Translate (without dictionary):

(*Old matter—Glaubenskies's Reader.*)

Aber jetzt fiel es dem Großvezier ein, daß das Lachen während der Verwandlung verboten war. Er theilte seine Angst deßwegen dem Kalifen mit. „Potz Mekka und Medina! Das wäre ein schlechter Spaß, wenn ich ein Storch bleiben müßte! Besinne dich doch auf das dumme Wort, ich bringe es nicht heraus." „Dreimal

müſſen wir uns gen Oſten bücken und dazu ſprechen: Mu—Mu—Mu—." Sie ſtellten ſich gegen Oſten und bückten ſich in einem fort, ſo daß ihre Schnäbel beinahe die Erde berührten. Aber, o Jammer! das Zauberwort war ihnen entfallen—und der arme Chaſid und ſein Begleiter waren und blieben Störche.

„Herr und Gebieter," flüſterte er leiſe, „wenn es nur nicht thöricht für einen Großvezier, noch mehr aber für einen Storch wäre, ſich vor Geſpenſtern zu fürchten! Mir iſt ganz unheimlich zu Muth, denn hier nebenan hat es ganz vernehmlich geſeufzt und geſtöhnt."

Von der Lücke, an welcher ſie ſtanden, konnten ſie einen großen Saal überſehen. Er war ringsum mit Säulen geſchmückt und prachtvoll verziert. Viele farbige Lampen erſetzten das Licht des Tages. In der Mitte des Saales ſtand ein runder Tiſch, mit vielen und ausgeſuchten Speiſen beſetzt. Rings um den Tiſch zog ſich ein Sofa, auf welchem acht Männer ſaßen. In einem dieſer Männer erkannten die Störche den Krämer wieder, welcher ihnen das Zauberpulver verkauft hatte. Sein Nebenſitzer forderte ihn auf, ſeine neueſten Thaten zu erzählen. Er erzählte unter andern auch die Geſchichte des Kalifen und ſeines Veziers. „Was für ein Wort haſt du ihnen denn aufgegeben?" fragte ihn ein anderer Zauberer. „Ein recht ſchweres lateiniſches, es heißt Mutabor."

2. Explain the word Poſt; give some analogous English (or French) words.
   Give the two sets of German names of the four cardinal points of the compass.
   What sort of box is called Kaſten, and what Doſe?
   Distinguish Pferd, Roß and Gaul.
   Of what Roman name is Kaiſer the German form?
   What (about) was the duration of the German empire? from when to when?

3. Supply (in English) the principal clause to which the clause wenn es nur ..... Geſpenſtern zu fürchten is subordinate.
   What is the subject of iſt in mir iſt ..... zu Muth?
   In what order of arrangement is each clause of the sentence: Rings um den Tiſch zog ſich ein Sofa, auf welchem die Männer ſaßen. Why?
   Select from the third extract a clause (or simple sentence) in the order of arrangement not exemplified in the above sentence.

4. Translate Mutabor into German.
   Give the second person singular of every tense of the indicative mood of fallen.
   Give the nominative singular of Schnäbel, Störche, Geſpenſtern, Lampen, Tages, Thaten.

In the phrase ein runder Tiſch mit Speiſen beſetzt, why is runder declined, and beſetzt not declined?

Why is runder declined as it is?

5. Write the stanzas beginning severally:

1. Es iſt nicht irdiſche Muſik,
2. Führten ſie nicht mit Wonne
3. Willſt, ſeiner Knabe, du mit mir geh'n?
4. Kennſt du das Haus? auf Säulen ruht ſein Dach,
5. So will ich liegen und horchen ſtill,

Name the poems of which they are parts, and the poets.

Third Term, or 105 Lessons in all.

February 30, 1872.

SOPHOMORE CLASS.

1. Translate (without dictionary):

(*New matter.*)

Der kleine Hydriot.

Ich war ein kleiner Knabe, ſtand feſt kaum auf dem Bein,
Da nahm mich ſchon mein Vater mit in das Meer hinein,
Und lehrte leicht mich ſchwimmen an ſeiner ſichern Hand
Und in die Fluthen tauchen bis nieder auf den Sand.
Ein Silberſtückchen warf er dreimal in's Meer hinab,
Und dreimal mußt' ich's holen, eh' er's zum Lohn mir gab.
Dann reicht' er mir ein Ruder, hieß in ein Boot mich geh'n;
Er ſelber blieb zur Seite mir unverdroſſen ſteh'n,
Wies mir, wie man die Wogen mit ſcharfem Schlage bricht,
Wie man die Wirbel meidet und mit der Brandung ficht.
Und von dem kleinen Kahne ging's flugs in's große Schiff;
Es trieben uns die Stürme um manches Felſenriff.
Ich ſaß auf hohem Maſte, ſchaut' über Meer und Land;
Es ſchwebten Berg' und Thürme vorüber mit dem Strand.
Der Vater hieß mich merken auf jedes Vogels Flug,
Auf aller Winde Wehen, auf aller Wolken Zug;
Und bogen dann die Stürme den Maſt bis an die Fluth,
Und ſpritzten dann die Wogen hoch über meinen Hut:
Da ſah der Vater prüfend mir in das Angeſicht;
Ich ſaß in meinem Korbe und rüttelte mich nicht.

Da ſprach er, und die Wange ward ihm wie Blut ſo roth:
„Glück zu auf deinem Maſte, du kleiner Hydriot!"
Und heute gab der Vater ein Schwert mir in die Hand,
Und weihte mich zum Kämpfer für Gott und Vaterland.
Er maß mich mit den Blicken vom Kopf bis zu den Zeh'n;
Mir war's, als thät ſein Auge hinab in's Herz mir ſeh'n.
Ich hielt mein Schwert gen Himmel, und ſchaut' ihn ſicher an,
Und däuchte mich zur Stunde nicht ſchlechter als ein Mann.
Da ſprach er, und die Wange ward ihm wie Blut ſo roth:
„Glück zu mit deinem Schwerte, du kleiner Hydriot."

Wilhelm Müller.

2. How ought the contents of the third and fourth lines of the poem to be arranged in prose?

3. What is the difference between Schwert, Degen and Säbel?

4. Decline das Herz.

5. What is a strong verb? what a weak verb? what an irregular (or anomalous) verb?

6. What vowel has the participle of a strong verb, if the preterit has a? i (ie)? o? u?

7. Wherein does the conjugation of reden differ from the conjugation of loben?

8. Mention the irregular (anomalous) verbs.

9. Translate (without dictionary):

(*Old matter—Schlegel's Grammar.*)

1. Do not wait. 2. Why does he not love his brother? 3. The sun and the moon shine. 4. Your father will hear it. 5. I sold my house. 6. Have we fulfilled our duty? 7. The ice broke. 8. The children drank milk. 9. She has become my friend. 10. This man sees nothing. 11. What were you reading, when I came? 12. I have carried it. 13. Who has cut the bread? 14. The poor man sleeps in safety. 15. The boy brought sugar and salt. 16. I cannot understand them; do you think they can understand me? 17. He never hesitates. 18. How tall you are! 19. Temperance is the best physician. 20. Railways and steamboats facilitate travel.

10. Write the stanzas beginning, severally,

1. Die ſchönſte Jungfrau ſitzet
2. Was ſchert mich Weib, was ſchert mich Kind?
3. Kennſt du das Land, wo die Citronen blüh'n?
4. Ich ſinge, wie der Vogel ſingt,
5. Sie ſingen von Lenz und Liebe, von ſel'ger goldner Zeit,

and name the poems from which they are taken, and the poets.

Fourth Term, or 150 Lessons in all.

June 10th, 1872.

SOPHOMORE CLASS.

1. Translate (without dictionary):

(*Old matter—Whitney's Reader.*)

Bruchstücke aus Goethe's Beschreibung des römischen Carnevals.

Alle Sonn- und Festtage ist der römische Carneval belebt. Die vornehmen und reichen Römer fahren hier eine oder anderthalb Stunden vor Nacht in sehr zahlreicher Reihe spazieren. Die Wagen kommen vom venetianischen Palast herunter, halten sich an der linken Seite, fahren, wenn es schön Wetter ist, an dem Obelisk vorbei, zum Thore hinaus und auf dem Flaminischen Weg, manchmal bis Ponte molle. Die früher oder später Umkehrenden halten sich an die andere Seite; so ziehen die beiden Wagenreihen in der besten Ordnung an einander hin. Sobald die Nacht eingeläutet wird, ist diese Ordnung unterbrochen; jeder wendet wo es ihm beliebt, und sucht seinen nächsten Weg, oft zur Unbequemlichkeit vieler andern Equipagen, welche in dem engen Raum dadurch gehindert und aufgehalten werden. Diese Abendspazierfahrt, welche in allen großen italienischen Städten brillant ist, und in jeder kleinen Stadt, wäre es auch nur mit einigen Kutschen, nachgeahmt wird, lockt viele Fußgänger in den Corso; jedermann kommt, um zu sehen oder gesehen zu werden.

Auf dem freien Platz suchen die Pferde noch einander den Vorsprung abzugewinnen, aber wenn sie einmal in den engen Raum zwischen die beiden Reihen Kutschen hineinkommen, wird meist aller Wetteifer vergeblich. Ein Paar sind gewöhnlich voraus, die alle Kräfte anstrengen. Ungeachtet der gestreuten Puzzolane gibt das Pflaster Feuer; die Mähnen fliegen, das Rauschgold rauscht, und kaum daß man sie erblickt, sind sie vorbei.

Nun wird es für einen jeden Pflicht, ein angezündetes Kerzchen in der Hand zu tragen. Ohne Unterschied, ob man Bekannte oder Unbekannte vor sich habe, sucht man nur immer das nächste Licht auszublasen, oder das seinige wieder anzuzünden.

2. Translate (without dictionary):

(*New matter.*)

Aus der italienischen Reise.

So war der Nachmittag vorbeigegangen, ohne daß wir in den Golf von Neapel eingefahren wären. Wir wurden vielmehr immer westwärts getrieben, und das Schiff entfernte sich immer mehr von dem Cap Minerva. Jedermann war verdrießlich und ungeduldig; wir beiden aber, die wir die Welt mit malerischen Augen

betrachteten, konnten damit sehr zufrieden sein, denn bei Sonnenuntergang genossen wir des herrlichsten Anblicks, den uns die ganze Reise gewährt hatte. In dem glänzendsten Farbenschmuck lag Cap Minerva mit den daranstoßenden Gebirgen vor unsern Augen, indeß die Felsen, die sich südwärts hinabziehen, schon einen bläulichen Ton angenommen hatten. Der Vesuv war uns sichtbar. Links lag Capri; die Formen seiner Felswände konnten wir durch den durchsichtigen bläulichen Dunst vollkommen unterscheiden. Unter einem ganz reinen, wolkenlosen Himmel glänzte das ruhige Meer. Wir entzückten uns an dem Anblick.

3. What does Römer mean when not derived from Rom, but correlated with Raum? What building in Germany is called der Römer?

Give native German words for Palast, Equipage, brillant.

Why is alle Sonn- und Festtage in the accusative?

Explain why schön is left undeclined in wenn es schön Wetter ist.

Make a relative clause of früher oder später Umkehrenden.

What word might be substituted for beliebt in wo es ihm beliebt?

When may room be translated by Raum? when must it be translated by Stube or Zimmer?

In Nun wird es für einen jeden Pflicht, what is the antecedent of es, and what is the case of Pflicht?

What is the case of sich in vor sich habe?

In the clause indeß die Felsen ..... angenommen hatten, why does indeß mean *while*, and not *in the mean while*?

Distinguish Renner from Läufer, Rennbahn from Laufbahn, Wettrennen from Wettlauf.

4. Translate (without dictionary):

(*Old matter—Schlegel's Grammar.*)

1. A child four years old is not strong enough for such a task. 2. Will you have another cup of tea? 3. The city of London, the capital of the kingdom of Great Britain, lies on the Thames. 4. The most beautiful flower has not always the finest odor. 5. Man is made for society. 6. I could not go to school; I had a headache. 7. Give a new book to the best one of your scholars. 8. Do you know that beautiful bird? 9. Do you know what the name of that beautiful bird is? 10. He has travelled much; he has seen the United States, the Netherlands, France, Italy, Switzerland and Russia. 11. To die is nothing; but to live and not to see, that is a misfortune. 12. He showed little patience. 13. What a little dog! 14. I have done my work; has he done his? 15. Charles the First and Lewis the Sixteenth were beheaded. 16. I shall be seventeen on the twelfth. 17. He did not come until half-past ten o'clock. 18. In the year fifteen hundred

and eighty Francis Drake made the first voyage around the world. 19. Who brought this letter? to whom did he give it? 20. The dogs of St. Bernard have saved the life of many a man.

5. Write the stanzas beginning severally:

1. Mein Vater, mein Vater, und ſiehſt du nicht dort
2. Kennſt du den Berg und ſeinen Wolkenſteg?
3. Gegrüßet ſeid mir, edle Herrn,
4. Dort ſaß ein ſtolzer König, an Land und Siegen reich,
5. Den Schiffer im kleinen Schiffe
6. So ſtehſt du, o Schloß meiner Väter,
7. Da fand ich eine Stadt, und laut
8. Wenn Wetternacht auf Wolken ſaß,

Name the poems of which they are parts, and the poets.

Fifth Term, or 225 Lessons in all.

February 5, 1872.

Junior Class.

1. Translate (with dictionary):

(*New matter.*)

Die Entdeckung Amerika's.

Als der Morgen anbrach, ſah das Schiffsvolk eine ſchöne, grüne Inſel vor ſich liegen. Mit Sonnenaufgang beſtiegen ſie die Böte und ruderten mit Kriegsmuſik und fliegenden Fahnen dem Lande zu. Am Ufer hatten ſich viele Einwohner der Inſel verſammelt, die eben ſo ſehr über die ſeltſamen Gäſte erſtaunten, als ſie ſelber bei dieſen Staunen erregten. Sie waren nackt, von einer röthlichen Kupferfarbe, übrigens wohlgebildet. Ihre Sprache hatte etwas Unzuſammenhängendes, Thieriſches, und aus allem, was man an ihnen ſah, leuchtete ſo wenig Verſtand hervor, daß die Spanier auf den Gedanken kamen, es möchten wohl gar nicht Menſchen ſein. Das waren ſie aber allerdings, nur ſtanden ſie auf einer ſehr niedrigen Stufe der Entwicklung. Sie kannten den Ackerbau nicht, das milde Klima und die Fruchtbarkeit ihrer Inſel gewährte ihnen Mais und Wurzeln im Ueberfluß, und zwang ſie nicht zur Sorge für Kleidung und Wohnungen. Große Thiere, die ihre Stärke und ihre Liſt hätten üben können, gab es dort gar nicht..... Columbus nahm die Inſel für die caſtiliſche Krone in Beſitz, mit den Formen und Feierlichkeiten, welche die Portugieſen bei ihren Entdeckungen in Afrika zu beobachten pflegten. Die Eingebornen ſahen das mit an und begriffen natürlich nichts davon, wie ihnen die ganze Erſcheinung weißer Männer mit Bärten und Kleidern, einer

ſeltſamen Sprache und noch ſeltſameren Manieren überhaupt etwas Unbegreifliches ſein mußte. Sie wähnten, ſie ſeien vom Himmel herabgekommen..... Das Gerücht von einer neuen Welt flog nun durch ganz Europa; den lebhafteſten Antheil erregte es jedoch in Spanien ſelbſt. In kurzer Zeit hatten ſich fünfzehnhundert Menſchen zuſammengefunden, die an dem zweiten Zuge, der nun in das eigentliche Goldland gehen ſollte, Theil nehmen wollten..... Vor allen Dingen holte man die Einwilligung des Papſtes ein, der auch nicht ermangelte, alle neu zu entdeckenden Länder der Krone von Caſtilien zu ſchenken, nur, daß er zu Gunſten Portugals dieſe Schenkungen auf die Länder jenſeits einer Mittagslinie beſchränkte, die er hundert Seemeilen weſtlich von den Azoren zog. Was dieſſeits gefunden würde, ſollte den Portugieſen gehören. Da dieſe aber mit der Entſcheidung unzufrieden waren, ſo kam nach einiger Zeit ein Vertrag zu Stande, welchem zufolge die Theilungslinie 370 Meilen weſtlich von jenen Inſeln gezogen ward. Dadurch blieb Braſilien in der Folge das Eigenthum Portugals. Becker.

2. Parse hätten üben können. Name the modal auxiliaries; state wherein their conjugation is irregular, and explain the irregularity. Translate: Er kann, muß, will, ſoll es gethan haben, and Er hat es thun können, müſſen, wollen, ſollen.

3. What is the gender of Europa? Give the German names of Asia and Australia; of the Atlantic and the Pacific ocean; of the Mediterranean and the Baltic sea; of Germany, France, Switzerland; of the Rhine, the Thames, the Danube; of Lisbon, Rome, Naples, Vienna, Ratisbon, Dunkirk, Flushing, the Hague.

4. What German word besides Inſel means Island? What is the German for Continent in the phrase "the five continents," and in the phrase "from the island to the continent"? How many German miles make a degree (of latitude)?

5. Translate (without the dictionary):

(*Old matter—Whitney's Exercises.*)

1. Jesting aside, we must be there at evening. 2. He has made the ascension of Jesus Christ the subject of a painting. 3. I have just seen something beautiful, and heard of something dreadful. 4. Mrs. S. is in town; if you want to see her, come to our house day after tomorrow. 5. Please try a cup of this genuine Russian tea. 6. Alas! the fate that we have to endure. 7. He looked in the eyes of one, and whispered in the ear of another. 8. For ten months the chief of the band of robbers was in prison. 9. The physician would gladly have decided as you wish; but his opinion differs somewhat from yours. 10. I am regularly provided by him with new books and periodicals. 11. Unawares we near the fateful hour. 12. There have been fewer

accidents on this railway. 13. We had been waiting for two hours when you arrived, and we should soon have given you up. 14. The schoolmaster imagines he is very learned. 15. To be able to enjoy life is surely a fine thing. 16. We called both the boys up to us; they came running. 17. I have nothing to reproach him for; he has behaved most handsomely. 18. The book has fallen upon the floor; it is lying there under the table.

Sixth Term, or 300 Lessons in all.

June 11, 1872.

Junior Class.

I. Translate (without the dictionary):

(*Old matter.*)

1. Wallenstein's Tod.

Aufzug 3. Auftritt 18.

Max. Doch wie geriethen wir, die nichts verſchuldet,
In dieſen Kreis des Unglücks und Verbrechens?
Wem brachen wir die Treue? Warum muß
Der Väter Doppelſchuld und Frevelthat
Uns gräßlich wie ein Schlangenpaar umwinden?
Warum der Väter unverſöhnter Haß
Auch uns die Liebenden zerreißend ſcheiden?

Wallenſtein. Max, bleibe bei mir! Geh' nicht von mir, Max!
Sieh, als man dich im Prag'ſchen Winterlager
Ins Zelt mir brachte, einen zarten Knaben
Des deutſchen Winters ungewohnt, die Hand
War dir erſtarrt an der gewicht'gen Fahne,
Du wollteſt männlich ſie nicht laſſen, damals nahm ich
Dich auf, bedeckte dich mit meinem Mantel,
Ich ſelbſt war deine Wärterin, nicht ſchämt' ich
Der kleinen Dienſte mich, ich pflegte deiner
Mit weiblich ſorgender Geſchäftigkeit,
Bis du, von mir erwärmt, an meinem Herzen,
Das junge Leben wieder freudig fühlteſt.
Wann hab' ich ſeitdem meinen Sinn verändert?
Ich habe viele Tauſend reich gemacht,
Mit Ländereien ſie beſchenkt, belohnt.

Mit Ehrenſtellen,—dich hab' ich geliebt,
Mein Herz, mich ſelber hab' ich dir gegeben.
Sie alle waren Fremdlinge, du warſt
Das Kind des Hauſes—Max, du kannſt mich nicht verlaſſen,
Es kann nicht ſein, ich mag's und will's nicht glauben,
Daß mich der Max verlaſſen kann.....
Geh' hin, verlaß mich, diene deinem Kaiſer,
Laß dich mit einem goldnen Gnadenkettlein,
Mit ſeinem Widderfell dafür belohnen,
Daß dir der Freund, der Vater deiner Jugend,
Daß dir das heiligſte Gefühl nichts galt.
.....Pflicht, gegen wen? Wer biſt du?
Wenn ich am Kaiſer unrecht handle, iſt's
Mein Unrecht, nicht das deinige. Gehörſt
Du dir? Biſt du dein eigener Gebieter,
Stehſt frei da in der Welt, wie ich, daß du
Der Thäter deiner Thaten könnteſt ſein?
Auf mich biſt du gepflanzt, ich bin dein Kaiſer,
Mir angehören, mir gehorchen, das
Iſt deine Ehre, dein Naturgeſetz.
Und wenn der Stern, auf dem du lebſt und wohnſt,
Aus ſeinem Gleiſe tritt, ſich brennend wirft
Auf eine nächſte Welt und ſie entzündet,
Du kannſt nicht wählen, ob du folgen willſt;
Fort reißt er dich in ſeines Schwunges Kraft
Sammt ſeinem Ring und allen ſeinen Monden.
Mit leichter Schuld gehſt du in dieſen Streit,
Dich wird die Welt nicht tadeln, ſie wird's loben,
Daß dir der Freund das Meiſte hat gegolten.

(*New matter.*)

2. Die Jungfrau von Orleans.

Aufzug 3. Auftritt 6.

Talbot. Hier unter dieſen Bäumen ſetzt mich nieder,
Und ihr begebt euch in die Schlacht zurück;
Ich brauche keines Beiſtands, um zu ſterben.

Faſtolf. O unglückſelig jammervoller Tag!
Zu welchem Anblick kommt ihr, Lionel!
Hier liegt der Feldherr, auf den Tod verwundet.

Lionel. Das wolle Gott nicht! Edler Lord, ſteht auf!

Talbot. Umsonst! Der Tag des Schicksals ist gekommen,
Der unsern Thron in Frankreich stürzen soll.

Lionel. Ich kann nicht bleiben.
Die Unsern fliehen schon von allen Seiten;
Unwiderstehlich dringt das Mädchen vor—

Talbot. Unsinn, du siegst, und ich muß untergeh'n;
Mit der Dummheit kämpfen Götter selbst vergebens.
Verflucht sei, wer sein Leben an das Große
Und Würd'ge wendet und bedachte Plane
Mit weisem Geist entwirft! Dem Narrenkönig
Gehört die Welt—

Lionel. Mylord! Ihr habt nur noch
Für wenige Augenblicke Leben—denkt
An euren Schöpfer!

Talbot. Wären wir als Tapfere
Durch andere Tapfere besiegt, wir könnten
Uns trösten mit dem allgemeinen Schicksal.
Doch solchem großen Gaukelspiel erliegen!
War unser ernstes arbeitsvolles Leben
Keines ernsthaftern Ausgangs werth?

Lionel. Mylord, fahrt wohl!
Auf Wiederseh'n in einer andern Welt!

Talbot. Bald ist's vorüber, und der Erde geb' ich
Der ew'gen Sonne die Atome wieder,
Die sich zu Schmerz und Lust in mir gefügt—
Und von dem mächt'gen Talbot, der die Welt
Mit seinem Kriegsruhm füllte, bleibt nichts übrig
Als eine handvoll leichten Staubs. So geht
Der Mensch zu Ende.

II.—1. To what is the allusion in der Väter Doppelschuld . . . umwinden?

2. When was the winter-camp at Prague? How many years before Wallenstein's death? How old was Max when he jumped his horse into the Elbe that he might rescue his father? Why was Max unaccustomed to the German winter?

3. What is meant by Laß dich mit seinem Widderfell belohnen?

4. What corps did Isolani command? What were his obligations to Wallenstein?

5. In what respect is Gordon contrasted with Wallenstein?

6. What is the meaning of Wallenstein's Er durft' es sagen, said in

response to Wrangel's Der Herrſchverſtändigſte, beliebt' ihm zu ſagen, ſollte Herrſcher ſein und König?

7. What mental power possessed generally by great commanders is attributed also to Wallenstein, and displayed in his interview with the corporal and soldiers?

8. What justified the poet in claiming the employment of rhyme for the German dramatic muse as an ancient right?

III.—1. Parse deiner in ich pflegte deiner.

2. In what meanings are pflegen and bewegen weak? in what meanings strong?

3. Parse ſelber in mich ſelber hab' ich dir gegeben. If the rhythm did not prevent, what word could be substituted? Compare these two words with the English *self*, and state what tendency in language they exemplify.

4. Of what peculiarity in the treatment of the adjective, frequently occurring in Schiller, does the line O unglückſelig jammervoller Tag offer an illustration?

5. Explain the termination of leichten in eine Handvoll leichten Staubs.

6. State and explain the anomalies in the conjugation of wiſſen.

7. What is meant by Attraction in grammar? give an illustration of its action in the Indirect discourse. Explain it.

8. In the lines Ich mach' mir an des Illo ſeinem Stuhl
Deßwegen auch zu thun, ſo viel ich kann,
Der führt dir gar verwunderſame Reden,
said, at Count Terzky's banquet, by one servant to another, which construction and which word characterize the speaker as illiterate? What is the force of dir?

IV.—Translate (without dictionary):

(*Old matter—Whitney's Exercises.*)

1. The sun is setting, and the air is cool; the Rhine flows quietly past; the evening sunlight illumines the top of the mountain—and I think of the old legend and grow sad.

2. Shakspeare portrays a soul which is not equal to the great deed laid upon it. We see how an oak, planted in a flower-pot, destroys the vessel by the expansion of its mighty roots. What is required of Hamlet, would be to a hero no heavy burden; but Hamlet is not a hero, and he cannot bear it.

3. Often, when you look upon the vast plain, you believe the great

shoreless ocean is spreading out before you. The prairie, hardly less than the ocean itself, fills the mind with the feeling of infinity.

4. The generations of beasts arise and pass away, without a thought of the significance of their life ever arising in them. Among all races of men, on the other hand, every important event is distinguished by an appropriate ceremony.

(New matter.)

5. Shallow men believe in luck, in circumstances: it was some body's name; he happened to be there at the time; it was so then, and another day it would have been otherwise. Strong men believe in cause and effect.

V.—1. Give the two lines (from the prologue) which express the value of the approbation of the best men of one's own time.

2. Also the four lines showing what opposite influence great and small objects exercise upon men.

3. Give the closing couplet of the Troopers' song.

4. Give Thekla's song.

5. Write the lines containing Wallenstein's contemptuous opinion of men as commonplace and influenced by custom.

6. In what form does the thought: "Coming events cast their shadows before," appear in Schiller?

7. Write any two passages in the drama, containing each, at least, a dozen lines; or the one beginning O, nimmer will ich ſeinen Glauben ſchelten; or any considerable portion of Wallenstein's Vision.

ONE YEAR'S COURSE.

First Term, or 75 Lessons in all.

January 30, 1872.

SENIOR CLASS.

(New matter—Dictionary allowed.)

1. Translate:

Das Rieſen-Spielzeug.

Im Elſaß, auf der Burg Niedeck, die auf einem hohen Berge bei einem Waſſerfall liegt, waren die Ritter vor Zeiten große Rieſen. Einmal ging das Rieſen-

fräulein herab in's Thal, wollte sehen, wie es da unten wäre, und kam bis nach Haßlach auf ein Ackerfeld, das gerade von den Bauern gepflügt ward. Sie blieb vor Verwunderung stehen und schaute den Pflug, die Pferde und die Leute an, das ihr alles etwas Neues war. „Ei," sprach sie, und ging herzu, „das nehm' ich mir mit." Da kniete sie nieder zur Erde, breitete ihre Schürze aus, strich mit der Hand über das Feld, fing alles zusammen und that's hinein. Nun lief sie ganz vergnügt nach Hause, den Felsen hinaufspringend; wo der Fels so jäh ist, daß ein Mensch mühsam klimmen muß, da that sie einen Schritt und war oben. Der Ritter saß gerade am Tisch, als sie eintrat. „Ei, mein Kind," sprach er, „was bringst du da? Die Freude schaut dir ja aus den Augen heraus." Sie machte geschwind ihre Schürze auf und ließ ihn hineinblicken. „Was hast du so Zappeliches darin?" „Ei, Vater, gar zu artiges Spielding! So was Schönes hab' ich mein Lebtag' noch nicht gehabt." Darauf nahm sie eines nach dem andern heraus und stellte es auf den Tisch: den Pflug, die Bauern mit ihren Pferden; lief herum, schaute es an, lachte und klatschte vor Freude in die Hände. Der Vater aber sprach: „Kind, das ist kein Spielzeug, da hast du etwas Schlimmes gethan! Geh' nur gleich und trag's wieder in's Thal hinab." Das Fräulein weinte, es half aber nichts. „Mir ist der Bauer kein Spielzeug; ich leid's nicht, daß du mir murrst; pack alles sachte wieder ein und trag's an den nämlichen Platz, wo du's genommen hast. Bauet der Bauer nicht sein Ackerfeld, so haben wir Riesen auf unserm Felsen-Nest nichts zu leben."

Die Brüder Grimm.

Die Knabenzeit.

Wie glücklich, wem das Knabenkleid
Noch um die Schultern fliegt!
Nie lästert er die böse Zeit,
Stets munter und vergnügt.

Das hölzerne Husarenschwert
Belustiget ihn itzt,
Der Kreisel und das Steckenpferd,
Auf dem er herrisch sitzt.

Und schwingt er durch die blaue Luft
Den bunt gestreiften Ball,
So achtet er nicht Blüthenduft,
Nicht Lerch', nicht Nachtigall.

Nichts trübt ihn, nichts in weiter Welt
Sein heit'res Angesicht,
Als wenn sein Ball in's Wasser fällt,
Als wenn sein Schwert zerbricht.

O Knabe, ſpiel' und laufe nur
Den lieben langen Tag
Durch Garten und durch grüne Flur
Den Schmetterlingen nach!

Bald ſchwitzeſt du, nicht immer froh,
Im engen Kämmerlein,
Und lernſt vom dicken Cicero
Verſchimmeltes Latein!

Hölty.

2. What is Inversion? Why is the first clause of the last sentence in the prose piece inverted? why the second clause?

3. What is Transposition? what is the rule for transposition? select an instance from the prose piece.

4. What is the singular of die Bauern? to what rule is this plural an exception? Die Schultern being a regular plural, what is the gender of Schulter?

5. Are the words ſie and ihr in the third sentence correct? referring, as they do, to Rieſenfräulein. What are the rules for the agreement of pronouns and pronominals, and of adjectives (and articles) with diminutives to which they refer or relate?

6. What is the difference between Männer, Menſchen and Leute? between Pferd and Roß? Argue the etymological connection of the words Roß and Horse.

7. Sie blieb ſtehen.—Give the same number and person of the present, the future, and the perfect. Translate: I keep my seat. I do not rise (remain abed).

8. Give the active form to the clause: Das von den Bauern gepflügt ward.

9. Translate (without dictionary):

(*Old matter—Whitney.*)

1. The blue flowers in the little basket are very beautiful. 2. The hero loves the noble and the dangerous. 3. The merchant gives me my bill, and I give him his money. 4. Who gives you permission? 5. The parson has two sons; the eldest is just sixteen years old, and the second is in the twelfth year of his age. 6. I have a cousin who talks too much, and no one heeds what he says. 7. We have fought well, but many have fallen on our side. 8. It rained very hard yesterday. 9. The ship has gone down, but the passengers are saved. 10. Let us begin. 11. Will the child be loved? 12. The churches and palaces, the antiquities and ruins pleased the strangers. 13. Our friend

enjoys his life. 14. I sincerely rejoice at your unexpected good fortune. 15. Would she have called me her enemy?

10. Give the dates of Lessing's birth and death. What is the moral of Nathan der Weiſe, and specially of the story of the three rings? From what source did Lessing take the story? How has he altered and ennobled it?

Second Term, or 150 Lessons in all.

June 14, 1872.

SENIOR CLASS.

I. Translate (without dictionary):

(*Old matter.*)

1. Göthe über Hamlet.

Man denke ſich einen Prinzen, wie ich ihn geſchildert habe, deſſen Vater unvermuthet ſtirbt. Ehrgeiz und Herrſchſucht ſind nicht die Leidenſchaften, die ihn beleben; er hatte ſich's gefallen laſſen, Sohn eines Königs zu ſein; aber nun iſt er genöthigt, auf den Abſtand aufmerkſamer zu werden, der den König vom Unterthan ſcheidet. Das Recht zur Krone war nicht erblich, und doch hätte ein längeres Leben des Vaters die Anſprüche ſeines einzigen Sohnes mehr befeſtigt, und die Hoffnung zur Krone geſichert. Dagegen ſieht er ſich nun durch ſeinen Oheim, ungeachtet ſcheinbarer Verſprechungen, vielleicht auf immer ausgeſchloſſen; er fühlte ſich nun arm an Gnade, an Gütern, und fremd in dem was er von Jugend auf als ſein Eigenthum betrachten konnte. Hier nimmt ſein Gemüth die erſte traurige Richtung.

2. Aus der ſiebenten Scene des Luſtſpiels: Badekuren.

Louiſe. Das Buch muß er mir borgen, die Lieder ſinge ich alle durch. Man kann's gleich, die Muſik ſteht dabei. Das hat er eingekniffſt, vielleicht ſein Lieblingslied. (Sie ſingt erſt leiſe, dann immer lauter: „Wohlauf noch getrunken den funkelnden Wein!")

Valentin (der unbemerkt eingetreten iſt, nach beendetem Geſang). Prächtig! allerliebſt! Das iſt daſſelbe Lied, das unſer Kleiner den ganzen Tag brummt.

Louiſe. O nicht doch, Valentin, er hat kein Gehör, er hält ein Lied für das andere.

Valentin. Das Lied kenne ich; und da iſt ja auch unſerm Kleinen ſein Buch, das er überall ſucht — der wird 'ne Freude haben, das bring' ich ihm gleich hin.

Louiſe. Auf keinen Fall. Das Buch darf Reinhold nicht wieder haben, und er ſagt ihm nichts—

Valentin. Aber er fragt mich des Tags zehnmal, ob ich's nicht gesehen habe.

Louise. So sag' er nein!

Valentin. Das ist aber gelogen.

Louise. Meinetwegen, Valentin, laß er mich nur in Ruhe.

Valentin (für sich). Die alte gnädige Frau schilt, wenn ich lüge, und die Kinder befehlen es mir. Da werde ein Anderer klug daraus. (Ab.)

Louise. Da hätte ich gut ankommen können. (Versteckt das Buch.) Das ist eine schöne Geschichte.

3. Aus der dreizehnten Scene.

Reinhold. Ich habe Alles noch einmal überschlagen.

Louise. So, Sie scheinen mir sehr sicher.

Reinhold. Und nun gerade heraus.

Louise. Machen Sie die Rechnung nicht ohne den Wirth, denn wenn die Mutter erfährt—

Reinhold. Ja, die darf es ja eben nicht wissen.

Louise. Nun, aber zuletzt wird sie's doch erfahren.

Reinhold. Am besten gar nicht. Wenn wir's ihr verheimlichen könnten.

Louise (bei Seite). Eine heimliche Ehe. (Laut.) Was meinen Sie nur eigentlich?

Reinhold. Nun gerade heraus, Louise. Sie sind eine reiche Frau!

Louise (bei Seite). Er wird mir doch nicht sagen wollen, daß er mich des Geldes wegen heirathet.

Reinhold. Mit einem Worte: Ich habe fünf hundert Thaler Schulden gemacht.

Louise (bei Seite). Immer besser, er nimmt mich um seine Schulden zu bezahlen.

Reinhold. Da dachte ich denn, es wäre am besten, um der Mutter den Aerger zu ersparen, wenn ich Sie bis zu meiner Majorennität um die fünf hundert Thaler anpumpte.

Louise. Ach! Und das ist Alles, was Sie mir sagen wollten?

Reinhold. Ich dachte, Sie hätten schon errathen.

Louise. Darum diese weiten Ausschweife?

Reinhold. Freilich! Was dachten Sie denn nur, Louise?

Louise (bei Seite, mit thränenerstickter Stimme). Es ist abscheulich!

Reinhold. Nicht wahr, Louise, die Sache ist abgemacht?

Louise. Sie sind ein Narr mit Ihren Heimlichkeiten—Was gehen mich Ihre Schulden an? Glauben Sie, daß ich auf Pfänder borge? Suchen Sie sich Ihre Vertrauten und Borger, wo Sie wollen und können, aber mich lassen Sie ein für allemal aus dem Spiele. Das ist abscheulich von Ihnen!

II.—1. What is the case of sich, what the antecedent of es, and what the case of Sohn in Er hatte sich's gefallen lassen, Sohn eines Königs zu sein?

2. Parse hätte befestigt. What other form of the verb might be substituted? To what extent are these two forms interchangeable?

3. Of what noun is Gütern the dative plural?

4. From what word is Gemüth derived? What is the wider, and what the narrower sense of that word? In what respect are some of its compounds exceptional?

5. From what verb is darf? Name the six modal auxiliaries. On what theory is the anomaly of their conjugation accounted for?

6. Explain the use of getrunken in Wohlauf! noch getrunken den funkelnden Wein! What sort of sparkling does funkeln denote? what word means *to sparkle* in the sense of *to effervesce?*

7. Which superlative is am besten? Give the other.

8. Give substitutes for Glück, Unglück, Ferse, Schlägerei, alte Frau of a kind with anpumpen.

III.—1. From what book is the disquisition upon Hamlet taken?

2. What book is spoken of in the seventh scene of the comedy?

3. To whom is the name Student restricted? What is Colleg? How are the classes of a Gymnasium named? how the scholars in these classes?

4. What is the literal meaning of the word Polterabend? what is a Polterabend?

5. What is the name of the highway from Heidelberg to Darmstadt?

6. State the subject and describe the form of Schiller's Song of the Bell.

IV.—Translate (without dictionary):

(*Old matter—Whitney.*)

1. Whence they come and whither they are going are both secrets. 2. We rested ourselves where a large oak spread abroad a grateful shade. 3. The more friendly I grow, the more repelling does he become. 4. My cousin takes a music lesson twice a week. 5. Thou foolish man! how canst thou act so imprudently? 6. If it is you, step nearer. 7. He persecutes me, who have never harmed him; and he loves thee, who canst not love him in return. 8. The family have been here since the first of August; on the twenty-fifth they intend to make an excursion into the country; and they will start at five o'clock in the morning. 9. Even if you have no inclination to it, do it to oblige your friend. 10. We have had enough of the rude, inconsiderate behavior of these men. 11. What means this standing and waiting? are you not allowed to go? 12. As soon as the lamp was lighted, the interrupted work was taken up again. 13. Whoever risks such a thing, relies upon an accident.

(*New matter.*)

14. He said: "I had nothing to do with it." He said, he had nothing to do with it. 15. If a man wish to conceal anything he carries, those whom he meets know that he conceals something; and usually they know what he conceals.

V.—Write the following quotations from Die Glocke:

1. The opening stanza.
2. The four lines beginning Das iſt's ja,
3. The six lines beginning O zarte Sehnſucht,
4. The six lines beginning Denn wo das Strenge
5. The three lines beginning Doch mit des Geſchickes Mächten
6. The three lines beginning Ein ſüßer Troſt
7. The four lines beginning Arbeit iſt des Bürgers Zierde,
8. The four lines beginning Gefährlich iſt's,

A METHOD OF INTEGRATING THE SQUARE ROOTS OF QUADRATICS.

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CONTENTS.

PART I.

To integrate the general form, $\int \sin^p\theta \cos^q\theta d\theta$ . . . . . (*a*), in all cases where p and q are integers, positive or negative.

Apply to (*a*) the formula for integrating by parts, viz.: $\int udv = vu - \int vdu$, by making $u = \sin^{p-1}\theta \cos^{q-1}\theta$ and $dv = \sin\theta\cos\theta$; $\therefore v = \frac{\sin^2\theta}{2}$, or $v = -\frac{\cos^2\theta}{2}$. If $v = \frac{\sin^2\theta}{2}$, we obtain formula (1) of the succeeding summary; but if $v = -\frac{\cos^2\theta}{2}$, we then obtain formula (2).

Again, since $1 = \sin^2\theta + \cos^2\theta$, $\int \sin^p\theta \cos^q\theta d\theta$,

$$= \int \sin^{p+2}\theta \cos^q\theta d\theta + \int \sin^p\theta \cos^{q+2}\theta d\theta \quad . . . . (c)$$

$$= \int \sin^p\theta \cos^{q-2}\theta d\theta - \int \sin^{p+2}\theta \cos^{q-2}\theta d\theta \quad . . . (d)$$

$$= \int \sin^{p-2}\theta \cos^q\theta d\theta - \int \sin^{p-2}\theta \cos^{q+2}\theta d\theta \quad . . . (e)$$

1st. Substitute in place of the last term of (*c*) its value as given by (1), from which process we shall obtain formula (3) of the summary.

2d. Substitute in place of the last term but one of (*c*), its value as given by (2), from which we shall obtain formula (4).

3d. Substitute in place of the last term of (*d*) its value as given by (2), from which we shall obtain formula (5).

4th. Substitute in place of the last term of (*e*) its value as given by (1), from which we shall obtain formula (6).

SUMMARY.

$$\int \sin^p\theta \cos^q\theta d\theta \quad \ldots \quad (a)$$

$$= \frac{1}{p+1}\sin^{p+1}\theta \cos^{q-1}\theta + \frac{q-1}{p+1}\int \sin^{p+2}\theta \cos^{q-2}\theta d\theta \quad \ldots \quad (1)$$

$$= -\frac{1}{q+1}\sin^{p-1}\theta \cos^{q+1}\theta + \frac{p-1}{q+1}\int \sin^{p-2}\theta \cos^{q+2}\theta d\theta \quad \ldots \quad (2)$$

$$= \frac{1}{p+1}\sin^{p+1}\theta \cos^{q+1}\theta + \frac{p+q+2}{p+1}\int \sin^{p+2}\theta \cos^{q}\theta d\theta \quad \ldots \quad (3)$$

$$= -\frac{1}{q+1}\sin^{p+1}\theta \cos^{q+1}\theta + \frac{p+q+2}{q+1}\int \sin^{p}\theta \cos^{q+2}\theta d\theta \quad \ldots \quad (4)$$

$$= \frac{1}{p+q}\sin^{p+1}\theta \cos^{q-1}\theta + \frac{q-1}{p+q}\int \sin^{p}\theta \cos^{q-2}\theta d\theta \quad \ldots \quad (5)$$

$$= -\frac{1}{p+q}\sin^{p-1}\theta \cos^{q+1}\theta + \frac{p-1}{p+q}\int \sin^{p-2}\theta \cos^{q}\theta d\theta \quad \ldots \quad (6)$$

In attempting to integrate the expression, $\int \sin^p\theta \cos^q\theta d\theta$ ... (a), (when p and q are integers, either positive or negative), there can only nine cases arise. These we shall now discuss seriatim, and, by showing them each to be integrable, prove the original expression integrable.

1. If p and q are both positive integers, one odd and the other even, by repeated applications of (5) and (6), (a) will depend either upon

$$\int \sin\theta d\theta = -\cos\theta,$$

or upon

$$\int \cos\theta d\theta = \sin\theta.$$

2. If p and q are both positive and even, by (5) and (6) finally we have only to integrate

$$\int d\theta = \theta.$$

3. If p and q are both positive and odd, by (5) and (6), (a) finally depends upon

$$\int \sin\theta \cos\theta d\theta = \frac{\sin^2\theta}{2}, \quad \text{or} \quad = -\frac{\cos^2\theta}{2}.$$

4. If p and q are both negative integers, one odd and the other even, by (3) and (4), (a) will depend either upon

$$\int \frac{d\theta}{\sin\theta} = \int \frac{\sin\theta d\theta}{\sin^2\theta} = \frac{1}{2}\left[\int \frac{\sin\theta d\theta}{1-\cos\theta} + \int \frac{\sin\theta d\theta}{1+\cos\theta}\right] = \frac{1}{2}\log_e\left[\frac{1-\cos\theta}{1+\cos\theta}\right]$$

$$= \log_e[\operatorname{cosec}\theta - \operatorname{cotang}\theta] = \log_e \operatorname{tang}\frac{\theta}{2},$$

or upon

$$\int \frac{d\theta}{\cos\theta} = \int \frac{\cos\theta d\theta}{\cos^2\theta} = \frac{1}{2}\left[\int \frac{\cos\theta d\theta}{1+\sin\theta} + \int \frac{\cos\theta d\theta}{1-\sin\theta}\right] = \frac{1}{2}\log_e\left[\frac{1+\sin\theta}{1-\sin\theta}\right]$$

$$= \log_e[\sec\theta + \tan\theta] = \log_e \tan\left(\frac{\theta}{2} + \frac{\pi}{4}\right).$$

5. If p and q are both negative and even, by (3) and (4), (a) will finally depend either upon

$$\int \frac{d\theta}{\sin^2\theta} = -\cot\theta, \quad \text{or upon} \quad \int \frac{d\theta}{\cos^2\theta} = \tan\theta.$$

6. If p and q are both negative and odd, by (3) and (4), (a) will depend upon

$$\int \frac{d\theta}{\sin\theta\cos\theta} = \int \frac{(\sin^2\theta + \cos^2\theta)}{\sin\theta\cos\theta} d\theta = \int \frac{\sin\theta}{\cos\theta} d\theta + \int \frac{\cos\theta}{\sin\theta} d\theta$$

$$= \log_e \sin\theta - \log_e \cos\theta = \log_e \tan\theta = -\log_e \cot\theta.$$

7. If p and q are one odd and the other even, one positive and the other negative.

When the odd number is numerically the larger, by (1) and (2), (a) will depend upon one of the four following forms (n being an integer):

$$\int \sin^{2n+1}\theta d\theta, \quad \int \cos^{2n+1}\theta d\theta, \quad \int \frac{d\theta}{\sin^{2n+1}\theta}, \quad \int \frac{d\theta}{\cos^{2n+1}\theta};$$

which forms have been already integrated.

When the even number is numerically the larger, we have similarly, by (1) and (2), four forms:

$$\int \frac{\sin^{2n}\theta d\theta}{\cos\theta}, \text{ which, by (6), depends on } \int \frac{d\theta}{\cos\theta} = \log_e \tan\left(\frac{\theta}{2} + \frac{\pi}{4}\right),$$

$$\int \frac{\cos^{2n}\theta d\theta}{\sin\theta}, \quad \text{“} \quad \text{“} \ (5), \quad \text{“} \quad \text{“} \quad \int \frac{d\theta}{\sin\theta} = \log_e \tan\frac{\theta}{2},$$

$$\int \frac{\sin\theta d\theta}{\cos^{2n}\theta}, \quad \text{“} \quad \text{“} \ (4), \quad \text{“} \quad \text{“} \quad \int \sin\theta d\theta = -\cos\theta,$$

$$\int \frac{\cos\theta d\theta}{\sin^{2n}\theta}, \quad \text{“} \quad \text{“} \ (3), \quad \text{“} \quad \text{“} \quad \int \cos\theta d\theta = \sin\theta.$$

8. If p and q are both even, one positive and the other negative, by (1) and (2) we have the four following forms:

$$\int \sin^{2n}\theta d\theta, \quad \int \frac{d\theta}{\sin^{2n}\theta} \quad \int \cos^{2n}\theta d\theta, \quad \int \frac{d\theta}{\cos^{2n}\theta};$$

which forms have already been integrated.

9. If p and q are both odd, one positive and the other negative, by (1) and (2) we have the four forms:

$\int \frac{\sin^{2n+1}\theta d\theta}{\cos\theta}$, which, by (6), depends on $\int \frac{\sin\theta d\theta}{\cos\theta} = -\log_e \cos\theta$,

$\int \frac{\cos^{2n+1}\theta d\theta}{\sin\theta}$ " " (5), " " $\int \frac{\cos\theta d\theta}{\sin\theta} = \log_e \sin\theta$,

$\int \frac{\sin\theta d\theta}{\cos^{2n+1}\theta}$, " " (4), " " $\int \frac{\sin\theta d\theta}{\cos\theta} = -\log_e \cos\theta$,

$\int \frac{\cos\theta d\theta}{\sin^{2n+1}\theta}$, " " (3), " " $\int \frac{\cos\theta d\theta}{\sin\theta} = \log_e \sin\theta$.

When, however, $(p+q)=0$, the above are failing cases of (5) and (6), but not of (1) and (2).

SUMMARY.

We can, therefore, by the use of formulas (1) to (6), inclusive, cause expression (a) to depend upon one of the following eight forms, provided that p and q are integers:

$$\int \sin\theta d\theta = -\cos\theta \quad \ldots \quad (7)$$

$$\int \cos\theta d\theta = \sin\theta \quad \ldots \quad (8)$$

$$\int \frac{\sin\theta d\theta}{\cos\theta} = -\log_e \cos\theta \quad \ldots \quad (9)$$

$$\int \frac{\cos\theta d\theta}{\sin\theta} = \log_e \sin\theta \quad \ldots \quad (10)$$

$$\int \frac{d\theta}{\sin\theta} = \log_e \left[\frac{1-\cos\theta}{\sin\theta}\right] = \log_e \tan\frac{\theta}{2} \quad \ldots \quad (11)$$

$$\int \frac{d\theta}{\cos\theta} = \log_e \left[\frac{1+\sin\theta}{\cos\theta}\right] = \log_e \tan\left[\frac{\theta}{2}+\frac{\pi}{4}\right] \quad \ldots \quad (12)$$

$$\int \frac{d\theta}{\sin\theta\cos\theta} = \log_e \tan\theta = -\log_e \cot\theta \quad \ldots \quad (13)$$

$$\int d\theta = \theta \quad \ldots \quad (14)$$

EXAMPLES.

1. $\int \frac{d\theta}{\sin^2\theta} = -\cot\theta$.

2. $\int \frac{d\theta}{\cos^2\theta} = \tan\theta$.

3. $\int \frac{\sin\theta d\theta}{\cos^2\theta} = \sec\theta = \frac{1}{\cos\theta}.$

4. $\int \frac{\cos\theta d\theta}{\sin^2\theta} = -\operatorname{cosec}\theta = -\frac{1}{\sin\theta}.$

5. $\int \sin^2\theta d\theta = \frac{1}{2}(\theta - \sin\theta\cos\theta).$

6. $\int \cos^2\theta d\theta = \frac{1}{2}(\theta + \sin\theta\cos\theta).$

7. $\int \frac{\sin^2\theta d\theta}{\cos^2\theta} = \operatorname{tang}\theta - \theta.$

8. $\int \frac{\cos^2\theta d\theta}{\sin^2\theta} = -\operatorname{cotang}\theta - \theta.$

9. $\int \frac{d\theta}{\sin^2\theta\cos^2\theta} = \operatorname{tang}\theta - \operatorname{cotang}\theta.$

10. $\int \sin\theta\cos\theta d\theta = \frac{1}{2}\sin^2\theta$, or $= -\frac{1}{2}\cos^2\theta.$

It is possible to apply each of the formulæ from (1) to (6), inclusive, to that part of itself which is still under the sign of integration, or to the corresponding part of either of the others. This operation can be repeated at will, and we thus obtain formulæ which are some of them useful, as they give at once the integral of expressions which it would otherwise require several processes to effect.

By repeatedly applying each of the formulæ (1) to (6) to *itself*, as suggested, we have the general forms of such expansions in the six following formulæ, which we arrive at after effecting n integrations (n being an integer greater than unity). These formulæ may be established by mathematical induction.

$$\int \sin^p\theta\cos^q\theta d\theta,$$

by (1):

$$= \frac{1}{p+1}\sin^{p+1}\theta\cos^{q-1}\theta + \frac{(q-1)}{(p+1)}\cdot\frac{1}{(p+3)}\sin^{p+3}\theta\cos^{q-3}\theta +$$

$$\frac{(q-1)}{(p+1)}\cdot\frac{(q-3)}{(p+3)}\cdot\frac{1}{(p+5)}\sin^{p+5}\theta\cos^{q-5}\theta + \quad \ldots\ldots\ldots \quad +$$

$$\frac{(q-1)(q-3)\ldots\ldots[q+1-2(n-1)]}{(p+1)(p+3)\ldots\ldots[p-1+2(n-1)]}\cdot\frac{\sin^{p-1+2n}\theta\cos^{q+1-2n}\theta}{[p+1+2(n-1)]} \quad +$$

$$\frac{(q-1)(q-3)\ldots\ldots(q+1-2n)}{(p+1)(p+3)\ldots\ldots(p-1+2n)}\int \sin^{p+2n}\theta\cos^{q-2n}\theta d\theta \quad \ldots \quad (15)$$

by (2):

$$= -\frac{1}{q+1}\sin^{p-1}\theta\cos^{q+1}\theta - \frac{(p-1)}{(q+1)}\cdot\frac{1}{(q+3)}\sin^{p-3}\theta\cos^{q+3}\theta -$$

$$\frac{(p-1)}{(q+1)}\cdot\frac{(p-3)}{(q+3)}\cdot\frac{1}{(q+5)}\sin^{p-5}\theta\cos^{q+5}\theta - \ldots\ldots\ldots -$$

$$\frac{(p-1)(p-3)\ldots\ldots[p+1-2(n-1)]}{(q+1)(q+3)\ldots\ldots[q-1+2(n-1)]}\cdot\frac{\sin^{p+1-2n}\theta\cos^{q-1+2n}\theta}{[q+1+2(n-1)]} +$$

$$\frac{(p-1)(p-3)\ldots\ldots(p+1-2n)}{(q+1)(q+3)\ldots\ldots(q-1+2n)}\int\sin^{p-2n}\theta\cos^{q+2n}\theta d\theta \quad . . \quad (16)$$

by (3):

$$= \frac{1}{p+1}\sin^{p+1}\theta\cos^{q+1}\theta + \frac{(p+q+2)}{(p+1)}\cdot\frac{1}{(p+3)}\sin^{p+3}\theta\cos^{q+1}\theta +$$

$$\frac{(p+q+2)}{(p+1)}\cdot\frac{(p+q+4)}{(p+3)}\cdot\frac{1}{(p+5)}\sin^{p+5}\theta\cos^{q+1}\theta + \ldots\ldots +$$

$$\frac{(p+q+2)(p+q+4)\ldots\ldots[p+q+2(n-1)]}{(p+1)\quad(p+3)\ldots\ldots[p-1+2(n-1)]}\cdot\frac{\sin^{p-1+2n}\theta\cos^{q+1}\theta}{[p+1+2(n-1)]} +$$

$$\frac{(p+q+2)(p+q+4)\ldots\ldots(p+q+2n)}{(p+1)(p+3)\ldots\ldots[p+1+2(n-1)]}\int\sin^{p+2n}\theta\cos^{q}\theta d\theta \quad . . \quad (17)$$

by (4):

$$= -\frac{1}{q+1}\sin^{p+1}\theta\cos^{q+1}\theta - \frac{(p+q+2)}{(q+1)}\cdot\frac{1}{(q+3)}\sin^{p+1}\theta\cos^{q+3} -$$

$$\frac{(p+q+2)}{(q+1)}\cdot\frac{(p+q+4)}{(q+3)}\cdot\frac{1}{(q+5)}\sin^{p+1}\theta\cos^{q+5}\theta - \ldots\ldots -$$

$$\frac{(p+q+2)(p+q+4)\ldots\ldots[p+q+2(n-1)]}{(q-1)(q+3)\ldots\ldots[q-1+2(n-1)]}\cdot\frac{\sin^{p+1}\theta\cos^{q-1+2n}\theta}{[q+1+2(n-1)]} +$$

$$\frac{(p+q+2)(p+q+4)\ldots\ldots(p+q+2n)}{(q+1)(q+3)\ldots\ldots[q+1+2(n-1)]}\int\sin^{p}\theta\cos^{q+2n}\theta d\theta \quad . . \quad (18)$$

by (5):

$$= \frac{1}{p+q}\sin^{p+1}\theta\cos^{q-1}\theta + \frac{(q-1)}{(p+q)}\cdot\frac{1}{(p+q-2)}\sin^{p+1}\theta\cos^{q-3}\theta +$$

$$\frac{(q-1)}{(p+q)}\cdot\frac{(q-3)}{(p+q-2)}\cdot\frac{1}{(p+q-4)}\sin^{p+1}\theta\cos^{q-5}\theta + \ldots\ldots +$$

$$\frac{(q-1)(q-3)\ldots\ldots[q+1-2(n-1)]}{(p+q)(p+q-2)\ldots\ldots[p+q+2-2(n-1)]}\cdot\frac{\sin^{p+1}\theta\cos^{q+1-2n}\theta}{[p+q-2(n-1)]} +$$

$$\frac{(q-1)(q-3)\ldots\ldots(q+1-2n)}{(p+q)(p+q-2)\ldots\ldots[p+q-2(n-1)]}\int\sin^{p}\theta\cos^{q-2n}\theta d\theta \quad (19)$$

by (6):

$$= -\frac{1}{p+q}\sin^{p-1}\theta\cos^{q+1}\theta - \frac{(p-1)}{(p+q)}\cdot\frac{1}{(p+q-2)}\sin^{p-3}\theta\cos^{q+1}\theta -$$

$$\frac{(p-1)}{(p+q)}\cdot\frac{(p-3)}{(p+q-2)}\cdot\frac{1\cdot}{(p+q-4)}\sin^{p-5}\theta\cos^{q+1}\theta - \quad . \quad . \quad . \quad . \quad . \quad -$$

$$\frac{(p-1)(p-3)\ldots.[p+1-2(n-1)]}{(p+q)(p+q-2)\ldots.[p+q+2-2(n-1)]}\cdot\frac{\sin^{p+1-2n}\theta\cos^{q+1}\theta}{[p+q-2(n-1)]} +$$

$$\frac{(p-1)(p-3)\ldots\ldots[p+1-2n]}{(p+q)(p+q-2)\ldots\ldots[p+q-2(n-1)]}\int\sin^{p-2n}\theta\cos^{q}\theta d\theta \quad (20)$$

If formulæ (1) to (6), inclusive, may be called *primaries*, we shall now give six *secondary* formulæ, (21) to (26), inclusive, which can be obtained by one operation of one of the primaries upon one of the others. These six (viz.: (21) to (26)), together with the six contained in the general formulæ (15) to (20), inclusive, are all the secondaries obtainable, and they may serve as an example of the tertiaries, &c., possible:

$$\int\sin^{p}\theta\cos^{q}\theta d\theta,$$

by applying (1) to (3):

$$= \frac{1}{p+1}\sin^{p+1}\theta\cos^{q-1}\theta + \frac{(q-1)}{(p+1)(p+3)}\sin^{p+2}\theta\cos^{q-1}\theta +$$

$$\frac{(q-1)(p+q+2)}{(p+1)(p+3)}\int\sin^{p+4}\theta\cos^{q-2}\theta d\theta \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (21)$$

by applying (2) to (4),

$$= -\frac{1}{q+1}\sin^{p-1}\theta\cos^{p+1}\theta - \frac{(p-1)}{(q+1)(q+3)}\sin^{p-1}\theta\cos^{q+2}\theta +$$

$$\frac{(p-1)(p+q+2)}{(q+1)(q+3)}\int\sin^{p-2}\theta\cos^{q+4}\theta d\theta \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (22)$$

by applying (1) to (5):

$$= \frac{1}{p+q}\sin^{p+1}\theta\cos^{q-1}\theta + \frac{(q-1)}{(p+q)(p+1)}\sin^{p+1}\theta\cos^{q-3}\theta +$$

$$\frac{(q-1)(q-3)}{(p+q)(p+1)}\int\sin^{p+2}\theta\cos^{q-4}\theta d\theta \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (23)$$

by applying (2) to (6):

$$= -\frac{1}{p+q}\sin^{p-1}\theta\cos^{q+1}\theta - \frac{(p-1)}{(p+q)(q+1)}\sin^{p-3}\theta\cos^{q+1}\theta +$$

$$\frac{(p-1)(p-3)}{(p+q)(q+1)}\int\sin^{p-4}\theta\cos^{q+2}\theta d\theta \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (24)$$

by applying (3) to (4):

$$= \frac{1}{p+1} \sin^{p+1}\theta \cos^{q+3}\theta - \frac{1}{q+1} \sin^{p+3}\theta \cos^{q+1}\theta +$$
$$\frac{(p+q+2)(p+q+4)}{(p+1)(q+1)} \int \sin^{p+2}\theta \cos^{q+2}\theta d\theta \quad \ldots\ldots\ldots \quad (25)$$

by applying (5) to (6):

$$= \frac{(p-1)}{(p+q)(p+q-2)} \sin^{p+1}\theta \cos^{q-1}\theta - \frac{(q-1)}{(p+q)(p+q-2)} \sin^{p-1}\theta \cos^{q+1}\theta +$$
$$\frac{(p-1)(q-1)}{(p+q)(p+q-2)} \int \sin^{p-2}\theta \cos^{q-2}\theta d\theta \quad \ldots\ldots\ldots \quad (26)$$

PART II.

To integrate the general form, $u = \int (a + bx + cx^2)^{\frac{n}{2}} x^m dx$. . (*b*) in all cases when m and n are integers, positive or negative, provided the constants a, b, and c are such as to render the integral real.

By change of form, we have, if

$$u = \int (a + bx + cx^2)^{\frac{n}{2}} x^m dx \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (b)$$

$$u = \sqrt{-c^n} \int \left[\frac{b^2 - 4ac}{4c^2} - \left(x + \frac{b}{2c}\right)^2\right]^{\frac{n}{2}} x^m dx \quad . \quad . \quad . \quad (f)$$

$$u = \sqrt{-a^n} \int \left[\frac{b^2 - 4ac}{4a^2} - \left(x^{-1} + \frac{b}{2a}\right)^2\right]^{\frac{n}{2}} x^{m+n} dx \quad . \quad . \quad (g)$$

$$u = \sqrt{c^n} \int \left[\left(x + \frac{b}{2c}\right)^2 - \frac{b^2 - 4ac}{4c^2}\right]^{\frac{n}{2}} x^m dx \quad . \quad . \quad . \quad . \quad (h)$$

$$u = \sqrt{a^n} \int \left[\left(x^{-1} + \frac{b}{2a}\right)^2 - \frac{b^2 - 4ac}{4a^2}\right]^{\frac{n}{2}} x^{m+n} dx \quad . \quad . \quad . \quad (k)$$

We shall now point out briefly what transformations will cause these forms to depend for their integration upon that of (*a*).

1st. Formula (*f*) may be integrated when m is positive and $r^2 = \frac{b^2 - 4ac}{4c^2} > 0$; for, let $x + \frac{b}{2c} = r \sin\theta$; $\therefore\ dx = r\cos\theta d\theta$, and $\left[\frac{b^2 - 4ac}{4c^2} - \left(x + \frac{b}{2c}\right)^2\right]^{\frac{n}{2}} = r^n \cos^n\theta$. Substituting, we have,

$$u = r^{n+m+1} \sqrt{-c^n} \int \left[\sin\theta - \frac{b}{2cr}\right]^m \cos^{n+1}\theta d\theta \quad . \quad . \quad . \quad (27)$$

which is real when c is negative, and is integrated by expanding, multiplying, and thus obtaining several terms of the form of (*a*).

This transformation might have been effected with equal ease by putting $x + \frac{b}{2c} = r\cos\theta$, etc., etc.

2d. Formula (g) may be integrated when m is negative, and $r^2 = \frac{b^2 - 4ac}{4a^2} > 0$; for, let $x^{-1} + \frac{b}{2a} = r\sin\theta$; $\therefore\ -\frac{dx}{x^2} = r\cos\theta d\theta$, and $\left[\frac{b^2 - 4ac}{4a^2} - \left(x^{-1} + \frac{b}{2a}\right)^2\right]^{\frac{n}{2}} = r^n\cos^n\theta$. Substituting, we have,

$$u = -r^{-m-1}\sqrt{-a^n}\int\left[\sin\theta - \frac{b}{2ar}\right]^{-(m+n+2)}\cos^{n+1}\theta d\theta \quad \ldots (28)$$

which is real when a is negative, and it is integrable whenever we can make $-(m + n + 2) > 0$, in which m is negative. This we can always effect by making the exponent of the quadratic any minus number desirable, as follows:

Multiply and divide (g) by

$$\left[\frac{b^2 - 4ac}{4a^2} - \left(x^{-1} + \frac{b}{2c}\right)^2\right]^{\frac{s}{2}},$$

in which $-(m - s + 2) > 0$, and expand the numerator to the power indicated by the exponent $\frac{s+n}{2}$ (which exponent must be an integer when s and n are odd). Thus we obtain several terms, each of which can be integrated by (28).

3d. Formula (h) may be integrated when m is positive and $r^2 = \frac{b^2 - 4ac}{4c^2} > 0$; for, let $x + \frac{b}{2c} = r\sec\theta$; $\therefore\ dx = \frac{r\sin\theta d\theta}{\cos^2\theta}$, and $\left[\left(x + \frac{b}{2c}\right)^2 - \frac{b^2 - 4ac}{4c^2}\right]^{\frac{n}{2}} = r^n\tan g^n\theta$. Substituting, we have,

$$u = r^{n+m+1}\sqrt{c^n}\int\left[\sec\theta - \frac{b}{2cr}\right]^m \frac{\tan g^{n+1}\theta d\theta}{\cos\theta} \quad \ldots (29)$$

which is real when c is positive, and depends upon (a) in the same manner as (27) and (28).

4th. Formula (k) may be integrated when m is negative, and $r^2 = \frac{b^2 - 4ac}{4a^2} > 0$; for, let $\left(x^{-1} + \frac{b}{2a}\right) = r\sec\theta$; $\therefore\ -\frac{dx}{x^2} = \frac{r\sin\theta d\theta}{\cos^2\theta}$ and $\left[\left(x^{-1} + \frac{b}{2c}\right)^2 - \frac{b^2 - 4ac}{4a^2}\right]^{\frac{n}{2}} = r^n\tan g^n\theta$. Substituting, we have,

$$u = -r^{-m-1}\sqrt{a^n}\int\left[\sec\theta - \frac{b}{2ar}\right]^{-(m+n+2)} \frac{\tan g^{n+1}\theta d\theta}{\cos\theta} \quad \ldots (30)$$

which is real when a is positive, and it is integrable when we render (as previously) $-(m + n + 2) > 0$.

5th. Formula (h) may be integrated when m is positive and $r^2 = -\frac{b^2-4ac}{4c^2} > 0$; for, let $x + \frac{b}{2c} = r\,\text{tang}\theta$; $\therefore\ dx = \frac{rd\theta}{\cos^2\theta}$. Substitute, and we have,

$$u = r^{n+m+1}\sqrt{c^n}\int\left[\text{tang}\theta - \frac{b}{2cr}\right)^m \frac{\sec^n\theta d\theta}{\cos^2\theta} \quad . \quad . \quad . \quad (31)$$

6th. Formula (k) may be integrated when m is negative and $r^2 = -\frac{b^2-4ac}{4a^2} > 0$; for let $x^{-1} + \frac{b}{4a} = r\,\text{tang}\theta$; $\therefore\ -\frac{dx}{x^2} = \frac{rd\theta}{\cos^2\theta}$. Substitute, and we have,

$$u = -r^{-m-1}\sqrt{a^n}\int\text{tang}\theta - \frac{b}{2ar}\Big]^{-(m+n+2)}\frac{\sec^n\theta d\theta}{\cos^2\theta} \quad . \quad . \quad (32)$$

SUMMARY.

$$u = \int(a + bx + cx^2)^{\frac{n}{2}}x^m dx \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (b)$$

If $x + \frac{b}{2c} = r\sin\theta$,

$$u = r^{m+n+1}\sqrt{-c^n}\int\left[\sin\theta - \frac{b}{2cr}\right]^m\cos^{n+1}\theta d\theta \quad . \quad . \quad . \quad (27)$$

If $x^{-1} + \frac{b}{2a} = r\sin\theta$,

$$u = -\frac{\sqrt{-a^n}}{r^{m+1}}\int\left[\sin\theta - \frac{b}{2ar}\right]^{-(m+n+2)}\cos^{n+1}\theta d\theta \quad . \quad . \quad (28)$$

If $x + \frac{b}{2c} = r\sec\theta$,

$$u = r^{m+n+1}\sqrt{c^n}\int\left[\frac{1}{\cos\theta} - \frac{b}{2cr}\right]^m\frac{\sin^{n+1}\theta d\theta}{\cos^{n+2}\theta} \quad . \quad . \quad . \quad (29)$$

If $x^{-1} + \frac{b}{2a} = r\sec\theta$,

$$u = -\frac{\sqrt{a^n}}{r^{m+1}}\int\left[\frac{1}{\cos\theta} - \frac{b}{2ar}\right]^{-(m+n+2)}\frac{\sin^{n+1}\theta d\theta}{\cos^{n+2}\theta} \quad . \quad . \quad (30)$$

If $x + \frac{b}{2c} = \text{tang}\theta$,

$$u = r^{m+n+1}\sqrt{c^n}\int\left[\frac{\sin\theta}{\cos\theta} - \frac{b}{2cr}\right]^m\frac{d\theta}{\cos^{n+2}\theta} \quad . \quad . \quad . \quad . \quad (31)$$

If $x^{-1} + \frac{b}{2a} = r\,\text{tang}\theta$,

$$u = -\frac{\sqrt{a^n}}{r^{m+1}}\int\left[\frac{\sin\theta}{\cos\theta} - \frac{b}{2ar}\right]^{-(m+n+2)}\frac{d\theta}{\cos^{n+2}\theta} \quad . \quad . \quad . \quad (32)$$

EXAMPLES.

1. $\int (a + bx + cx^2)^{\frac{p}{2}}(h + kx)^q dx.$

In this let $h + kx = x^1$; then the integral will be of the form (b), if p and q are integers.

2. $\int (a + bx)^{\frac{p}{2}}(h + kx)^{\frac{q}{2}}x^m dx$

$$= \int [(a + bx)(h + kx)]^{\frac{p}{2}}(h + kx)^{\frac{q-p}{2}}x^m dx, \text{ when } \frac{q-p}{2} > 0;$$

or,

$$= \int [(a + bx)(h + kx)^{\frac{q}{2}}(a + bx)^{\frac{p-q}{2}}x^m dx, \text{ when } \frac{p-q}{2} > 0.$$

Expand the binomial to the power $\pm \frac{p-q}{2}$. Since that is a positive integer, multiply and integrate the several terms each of the form (b).

3. $\int (a + cx^2)^{\frac{p}{2}}(h + ex^2)^{\frac{q}{2}}x^m dx$ may, in many cases, be transformed into (a) either by making $(a + cx^2) = r^2 \tan g^2\theta$ and $r^2 = -\frac{1}{h}(ah - ce)$ or $(ax^{-2} + c) = r^2 \tan g^2\theta$ and $r^2 = \frac{1}{e}(ah - ce)$. A full discussion of this form might be made, similar in nature to the discussion of form (b).

4. $$\int \frac{(1+cx^2)x^{p+q-2}dx}{(1-cx^2)^q(1+ax^2+c^2x^4)^{\frac{p}{2}}} = \int \frac{(x^{-2}+c)dx}{(x^{-1}-cx)^q[(x^{-1}-cx)^2+a+2c]^{\frac{p}{2}}},$$

In this let $(x^{-1} + cx) = r \tan g\theta$ and $r^2 = a + 2c$.

5. $$\int \frac{(b+ex^2+bc^2x^4)x^{p-1}dx}{(1-c^2x^4)(1+ax^2+c^2x^4)^{\frac{p}{2}}}$$

$$= \frac{2bc+e}{4c}\int \frac{(1+cx^2)x^{p-1}dx}{(1-cx^2)(1+ax^2+c^2x^4)^{\frac{p}{2}}} + \frac{2bc-e}{4c}\int \frac{(1-cx^2)x^{p-1}dx}{(1+cx^2)(1+ax^2+c^2x^4)^{\frac{p}{2}}},$$

which is a case of Example 4.

It may be stated, in conclusion, that the method herein briefly sketched, by which integrals containing some power of the square root of a quadratic are transformed and made to depend on form (a), has been found by the author, in practice, to be practicable, expeditious, and useful, especially when a proper transformation of limits is effected at the same time as the first-mentioned transformation.

NOTE A.

The following tables of relations between circular functions will facilitate the necessary transformations.

TABLE I.

Relations between the Direct Circular Functions.

$\sin\theta$	$= \sqrt{1-\cos^2\theta}$	$= \frac{\tan\theta}{\sqrt{1+\tan^2\theta}}$	$= \frac{1}{\sqrt{1+\cot^2\theta}}$	$= \frac{\sqrt{\sec^2\theta-1}}{\sec\theta}$	$= \frac{1}{\operatorname{cosec}\theta}$
$\sqrt{1-\sin^2\theta}$	$= \cos\theta$	$= \frac{1}{\sqrt{1+\tan^2\theta}}$	$= \frac{\cot\theta}{\sqrt{1+\cot^2\theta}}$	$= \frac{1}{\sec\theta}$	$= \frac{\sqrt{\operatorname{cosec}^2\theta-1}}{\operatorname{cosec}\theta}$
$\frac{\sin\theta}{\sqrt{1-\sin^2\theta}}$	$= \frac{\sqrt{1-\cos^2\theta}}{\cos\theta}$	$= \tan\theta$	$= \frac{1}{\cot\theta}$	$= \sqrt{\sec^2\theta-1}$	$= \frac{1}{\sqrt{\operatorname{cosec}^2\theta-1}}$
$\frac{\sqrt{1-\sin^2\theta}}{\sin\theta}$	$= \frac{\cos\theta}{\sqrt{1-\cos^2\theta}}$	$= \frac{1}{\tan\theta}$	$= \cot\theta$	$= \frac{1}{\sqrt{\sec^2\theta-1}}$	$= \sqrt{\operatorname{cosec}^2\theta-1}$
$\frac{1}{\sqrt{1-\sin^2\theta}}$	$= \frac{1}{\cos\theta}$	$= \sqrt{1+\tan^2\theta}$	$= \frac{\sqrt{1+\cot^2\theta}}{\cot\theta}$	$= \sec\theta$	$= \frac{\operatorname{cosec}\theta}{\sqrt{\operatorname{cosec}^2\theta-1}}$
$\frac{1}{\sin\theta}$	$= \frac{1}{\sqrt{1-\cos^2\theta}}$	$= \frac{\sqrt{1+\tan^2\theta}}{\tan\theta}$	$= \sqrt{1+\cot^2\theta}$	$= \frac{\sec\theta}{\sqrt{\sec^2\theta-1}}$	$= \operatorname{cosec}\theta$

TABLE II.

Relations between the Inverse Circular Functions.

$\sin^{-1}x$	$= \cos^{-1}\sqrt{1-x^2}$	$= \tan^{-1}\frac{x}{\sqrt{1-x^2}}$	$= \cot^{-1}\frac{\sqrt{1-x^2}}{x}$	$= \sec^{-1}\frac{1}{\sqrt{1-x^2}}$	$= \operatorname{cosec}^{-1}\frac{1}{x}$
$\sin^{-1}\sqrt{1-x^2}$	$= \cos^{-1}x$	$= \tan^{-1}\frac{\sqrt{1-x^2}}{x}$	$= \cot^{-1}\frac{x}{\sqrt{1-x^2}}$	$= \sec^{-1}\frac{1}{x}$	$= \operatorname{cosec}^{-1}\frac{1}{\sqrt{1-x^2}}$
$\sin^{-1}\frac{x}{\sqrt{1+x^2}}$	$= \cos^{-1}\frac{1}{\sqrt{1+x^2}}$	$= \tan^{-1}x$	$= \cot^{-1}\frac{1}{x}$	$= \sec^{-1}\sqrt{+1x^2}$	$= \operatorname{cosec}^{-1}\frac{\sqrt{1+x^2}}{x}$
$\sin^{-1}\frac{1}{\sqrt{1+x^2}}$	$= \cos^{-1}\frac{x}{\sqrt{1+x^2}}$	$= \tan^{-1}\frac{1}{x}$	$= \cot^{-1}x$	$= \sec^{-1}\frac{\sqrt{1+x^2}}{x}$	$= \operatorname{cosec}^{-1}\sqrt{1+x^2}$
$\sin^{-1}\frac{\sqrt{x^2-1}}{x}$	$= \cos^{-1}\frac{1}{x}$	$= \tan^{-1}\sqrt{x^2-1}$	$= \cot^{-1}\frac{1}{\sqrt{x^2-1}}$	$= \sec^{-1}x$	$= \operatorname{cosec}^{-1}\frac{x}{\sqrt{x^2-1}}$
$\sin^{-1}\frac{1}{x}$	$= \cos^{-1}\frac{\sqrt{x^2-1}}{x}$	$= \tan^{-1}\frac{1}{\sqrt{x^2-1}}$	$= \cot^{-1}\sqrt{x^2-1}$	$= \sec^{-1}\frac{x}{\sqrt{x^2-1}}$	$= \operatorname{cosec}^{-1}x$

NOTE B.

The symmetrical manner in which formulæ (1) to (6), inclusive, are obtained may be further shown by the following process of obtaining the ordinary reduction formulæ for the form,

$$\int X^p x^{m-1} dx \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (b^1)$$

in which $X = a + bx^n$. Integrating by parts, the parts being indicated by the period,

$$\int X^p \,.\, x^{m-1} dx = \frac{X^p x^m}{m} - \frac{bnp}{m} \int X^{p-1} x^{m+n-1} dx \quad . \quad . \quad . \quad . \quad . \quad . \quad . (1)$$

or,

$$\int x^{m-n} \,.\, X x^{n-1} dx = \frac{X^{p+1} x^{m-n}}{bn(p+1)} - \frac{m-n}{bn(p+1)} \int X^{p+1} x^{m-n-1} dx \quad . \quad . \quad (2)$$

It is to be noticed that (1) and (2) are the *only* integrations by parts of (b^1) which are *binomials*. Again, we have identically by separation,

$$\int X^p x^{m-1} dx = a \int X^{p-1} x^{m-1} dx + b \int X^{p-1} x^{m+n-1} dx \quad . \quad . \quad (s^1)$$

$$\int X^{p+1} x^{m-1} dx = a \int X^p x^{m-1} dx + b \int X^p x^{m+n-1} dx \quad . \quad . \quad . \quad (s)$$

$$\int X^{p+1} x^{m-n-1} dx = a \int X^p x^{m-n-1} dx + b \int X^p x^{m-1} dx. \quad . \quad . \quad (s_1)$$

It is to be noticed that (s^1), (s), and (s_1) are the *only* separations of (b^1) which are *binomials*.

If now the last term of (s^1) be integrated by parts in the same manner as (2), we shall obtain (5) of the following summary, after solving for (b^1).

If the last term of (s) be integrated by parts similarly to (2), we shall obtain (4).

If the first term of (s) be integrated by parts similarly to (1), we shall obtain (3).

If the first term of (s_1) be integrated by parts similarly to (1), we shall obtain (6).

It is to be noticed that (3), (4), (5), and (6) are the *only* integrations by parts of (s^1), (s), and (s_1) which are binomials.

SUMMARY.

$$\int X^p x^{m-1} dx \quad \ldots \ldots \ldots \ldots \quad (b^1)$$

$$= \frac{X^p x^m}{m} - \frac{bnp}{m} \int X^{p-1} x^{m+n-1} dx \quad \ldots \ldots \quad (1)$$

$$= \frac{X^{p+1} x^{m-n}}{bn(p+1)} - \frac{m-n}{bn(p+1)} \int X^{p+1} x^{m-n-1} dx \quad \ldots \quad (2)$$

$$= \frac{X^{p+1} x^m}{am} - \frac{b(m+n+np)}{am} \int X^p x^{m+n-1} dx \quad \ldots \quad (3)$$

$$= \frac{-X^{p+1} x^m}{an(p+1)} + \frac{m+n+np}{an(p+1)} \int X^{p+1} x^{m-1} dx \quad \ldots \quad (4)$$

$$= \frac{X^p x^m}{m+np} + \frac{anp}{m+np} \int X^{p-1} x^{m-1} dx \quad \ldots \ldots \quad (5)$$

$$= \frac{X^{p+1} x^{m-n}}{b(m+np)} - \frac{a(m-n)}{b(m+np)} \int X^p x^{m-n-1} dx \quad \ldots \quad (6)$$

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